

## 1. DESCRIPTION

These external speaker-microphones contain a hand-held speaker, microphone, and push-to-talk switch. A cable, terminated with a special plug, is provided for attaching to the accessory connector on the side of the MT500 universal series "Handie-Talkie" FM portable radios.

When the external speaker-microphone is attached to the radio, the internal speaker in the radio is disabled, and receiver audio output is connected to the external speaker. Similarly, the external microphone is connected to the transmitter and the external push-to-talk switch will energize the PTT relay in the radio.

With the external speaker-microphone attached to the radio, the internal microphone and push-to-talk switch are still operational, but you must always listen at the external speaker.

A spring clip on the back of the external speaker-microphone can be rotated for convenience when securing it to clothing.

## 2. OPERATION

a. Place the lip of the external speaker-microphone plug (P1) in the slot on top of the radio (above the accessory connector) and pivot the plug into the accessory connector on the radio.

b. Tighten the threaded stud on the plug into the threaded hole on the radio.

c. While listening to the external speaker, turn the radio on and operate as explained in the operating manual supplied with the radio.

### NOTE

NMN6089A is used with the NLN4477A Adapter Cable.

## 3. MAINTENANCE

Refer to the schematic diagram, the exploded view, and the parts lists. Every part in the speaker-microphone is identified and illustrated for assistance in removal and replacement.

## For MT500 Universal Series FM Radios

MODEL NMN6081A, STRAIGHT CORD

MODEL NMN6082A, COILED CORD

MODEL NMN6089A, COILED CORD "QUICK DISCONNECT"

### Speaker-Microphone Kits:

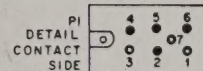
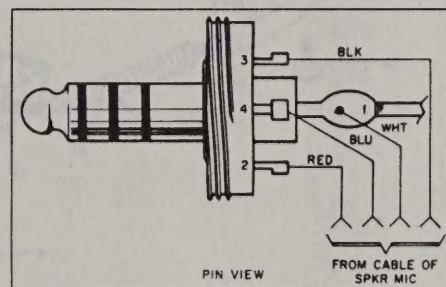
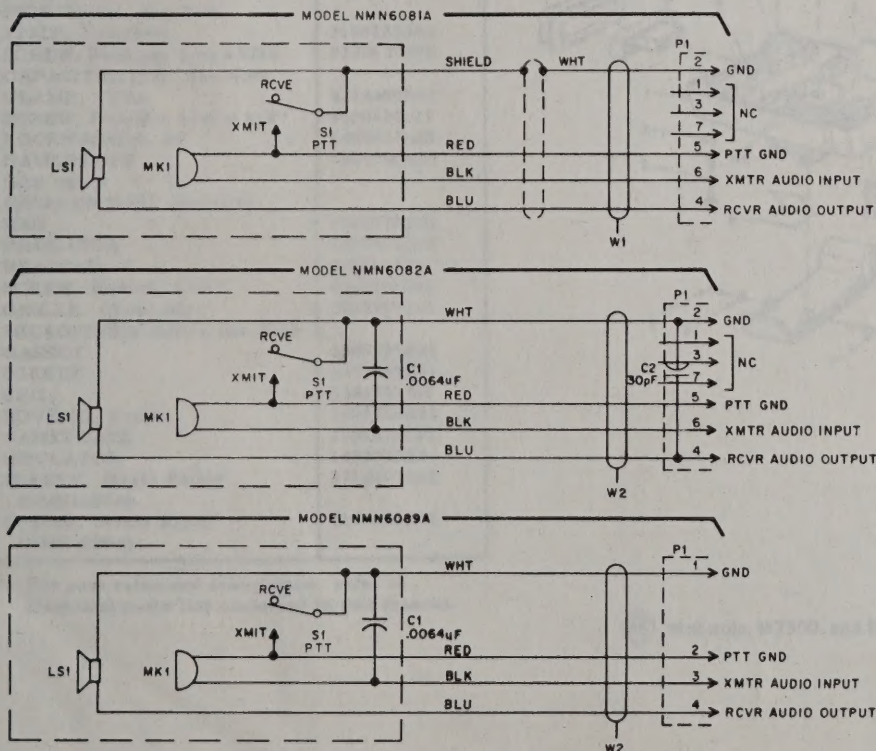
NMN6081A, Straight Cord

NMN6082A, Coiled Cord

NMN6089A, Coiled Cord "Quick Disconnect"

PLF-1238-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C1	2184008H05	<b>CAPACITOR, Fixed:</b> .0064 $\mu$ F $\pm 10\%$ ; 50 V (NMN6082A only)
C2	2182358G95	
LS1	5005334D01	<b>SPEAKER, Dynamic:</b> 39 $\Omega$ , 2-inch diameter
MK1	5982575J02	<b>MICROPHONE:</b> Miniature; Res: 700 $\Omega$ , Imped: 5000 $\Omega \pm 30\%$
P1	2805646F02 or 2805780G02	<b>PLUG:</b> Connector, 7-contact (NMN6081A, NMN6082A) Connector (NMN6089A)
S1	4082159D01	<b>SWITCH:</b> Micro; PTT, SPDT
W1	3084048H02	<b>CORD:</b> Straight, 48" Coiled
W2	3084123H02	



MODELS	SUFFIX
NMN6081A	1
NMN6082A	1
NMN6089A	-







# PARTS LOCATION AND IDENTIFICATION

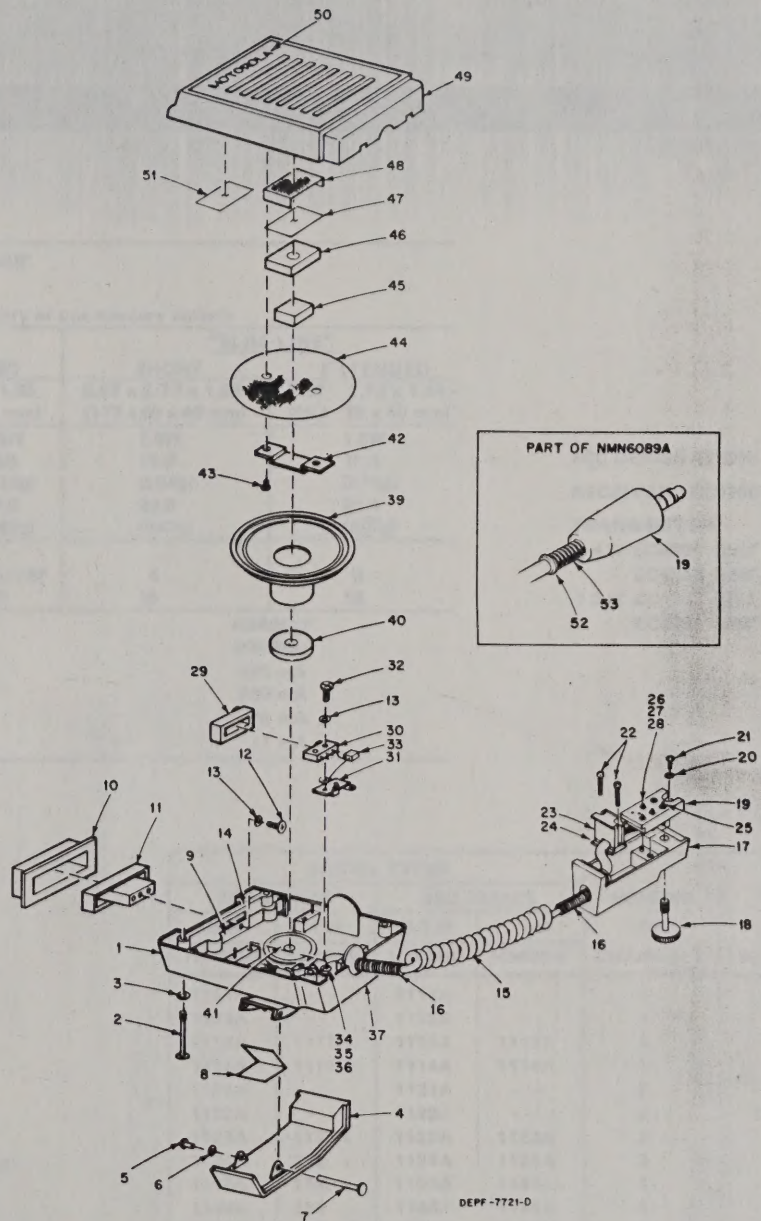
## Speaker-Microphone Exploded View

NMN6081A Straight Cord

NMN6082A Coiled Cord

PLF-1239-C

ITEM NO.	NOMENCLATURE	MOTOROLA PART NO.
1	HOUSING, Back	0105958B64
2	SCREW, Captive	0382210E03
3	WASHER, Insulator	0482418B09
4	CLIP, Pocket	4284416H05
5	SCREW, Tapping	0300115043
6	WASHER, Flat	0400001793
7	PIN, Clip	2282395B29
8	SPRING, Clip	4105942A01
9	SPRING, Actuator	4184491H01
10	BOOT	3205720B01
11	PUSHBUTTON	3805718B01
12	SCREW, Tapping; 2-56 x 5/16"	0300136914
13	LOCKWASHER, #2	0400008406
14	INSERT, Microphone	4305721B01
15	CORD (W1) or (W2), See Note	-
16	SPRING, Strain Relief (NMN6081A, NMN6082A)	4105466B02
17	HOUSING, Connector (NMN6081A, NMN6082A)	1505710D01
18	SCREW, Thumb (NMN6081A, NMN6082A)	0305822D03
19	PLUG, Connector; (P1) See Note	-
20	LOCKWASHER	0400115361
21	SCREW, Phillips; 2-56 x 1/4"	0300132342
22	SCREW, Phillips; 2-56 x 3/8"	0300139750
23	STRAP, Cable (NMN6081A, NMN6082A)	4205591E01
24	CLAMP, Cable (NMN6081A, NMN6082A)	4205590E01
25	CONTACT, Stud	3905533E01
26	PIN, Contact (NMN6081A, NMN6082A)	3905767D01
27	SPRING, Contact (NMN6081A, NMN6082A)	4105768D01
28	RING, Retaining	4205463E01
29	BOOT	3205719B01
30	SWITCH (S1), See Note	-
31	STRIP, Terminal	3100125063
32	SCREW, Phillips; 2-56 x 5/16"	0300129074
33	CAPACITOR (C1), See Note	-
34	CLAMP, Cable	4284409H01
35	SCREW, Phillips; 4-40 x 1/4"	0300120621
36	LOCKWASHER, #4	0400007683
37	NAMEPLATE	3305150B19
38	NOT USED	-
39	SPEAKER (LS1), See Note	-
40	PAD	7505771B01
41	INSULATOR	1405922A01
42	BRACKET	0782158J01
43	SCREW, Slotted, 5/32"	0300139205
44	GRILLE, Cloth; felt	3505715B01
45	MICROPHONE (MK1), See Note	-
46	GASKET	3205735B01
47	SCREEN	3505450B01
48	GRILL	1382159J01
49	HOUSING, Front	1505722B03
50	NAMEPLATE	3305159D01
51	INSULATOR	1482392E05
52	SLEEVE, Strain Relief (NMN6089A)	3784379H01
53	SPRING, Strain Relief (NMN6089A)	4105275B01



DEPF-7721-D

NOTE: For part value and description, refer to electrical parts list contained in this manual.

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# MOTOROLA

## MT500 SERIES

### "Handie-Talkie" FM Two-Way Radios

403-512 MHz

#### SPECIFICATIONS

##### GENERAL

Model Series:	H24BBU', H24BBB', H34BBU', H34BBB'					
Frequency:	403-512 MHz					
Power Supply:	One rechargeable nickel-cadmium battery or one mercury battery					
Dimensions: less antenna & knobs (H x W x D in inches):	"OMNI"				"SLIM-LINE"	
	SHORT		EXTENDED		SHORT	EXTENDED
	6.97 x 2.73 x 1.85 (177 x 69 x 47 mm)		7.62 x 2.73 x 1.85 (193 x 69 x 47 mm)		6.97 x 2.73 x 1.59 (177 x 69 x 40 mm)	7.62 x 2.73 x 1.59 (193 x 69 x 40 mm)
Weight (ounces)	4W	1.5W	4W	1.5W	1.5W	1.5W
Nickel-Cadmium Battery:	25.3 (717g)	24.9 (706g)	25.9 (734g)	25.5 (723g)	19.9 (564g)	20.4 (578g)
Mercury Battery:	26.8 (760g)	26.4 (748g)	27.4 (777g)	27.0 (766g)	20.9 (593g)	21.4 (607g)
Battery Life (hours)						
Nickel-Cadmium Battery:	8	14 or 9*	8	14 or 9*	8	8
Mercury Battery:	25	30*	25	30*	18	18
Current Drain: (Using 15 Vdc Supply)						
Transmit 1.5 W:	H24BBB' H34BBB'			H24BBU' H34BBU'		
4.0 W:	405 mA 970 mA			425 mA 990 mA		
**Receive:	70 mA			70 mA		
**Standby:	11 mA			11 mA		

FCC DESIGNATION:

RECEIVER RC0150

TRANSMITTER

4 W CC4254 BBU'

CC4253 BBB'

1.5 W CC4252 BBU'

CC4251 BBB'

\* 10 - 10 - 80 duty cycle - all others have a 5 - 5 - 90 duty cycle.

\*\* Add 3 mA for Tone PL and 4 mA for Digital PL.

##### RECEIVER

Frequency Stability - (-30° C to +60° C; +25° C Ref):	± .0005%
Channel Spacing:	25 kHz
Sensitivity -	
20 dB Quieting:	0.50 uV
12 dB SINAD:	0.35 uV
Squelch PL:	0.25 uV
Modulation Acceptance:	7.5 kHz
Intermodulation (EIA SINAD):	70 dB
Spurious/Interference Rejection:	70/60 dB
Selectivity (EIA SINAD):	70 dB
	75 dB (optional)
Frequency Separation -	
No Degradation:	1 MHz
3 dB Sensitivity Degradation:	2 MHz
Audio Output - (At less than 5% distortion):	500 mW

##### TRANSMITTER

RF Power Output -	H24BBB'	H34BBB'
	H24BBU'	H34BBU'
15 Vdc Nickel-Cadmium Battery:	1.5 W	4.0 W
12.7 Vdc Mercury Battery NLN6762, NLN6936:	1.0 W	2.0 W
12.0 Vdc Mercury Battery NLN6683:	0.7 W	—
Modulation:	16F3	
Frequency Stability - (-30° C to +60° C; +25° C Ref):	± .0005%	
FM Noise:	55 dB	
Audio Distortion (At 1000 Hz, 3% deviation):	3%	
Frequency Spacing - (No degradation):	6 MHz	

MODEL TYPES				NUMBER OF CHANNELS	TYPE OF SQUELCH
BBB SERIES		BBU SERIES			
1.5 W	4 W	1.5 W	4 W		
H24BBB'	H34BBB'	H24BBU'	H34BBU'		
1111A	---	1111A	---	1	Carrier
1112A	---	1112A	---	1	
1113A	1113A	1113A	1113A	1	
1114A	1114A	1114A	1114A	1	
1121A	---	1121A	---	2	
1122A	---	1122A	---	2	
1123A	1123A	1123A	1123A	2	
1124A	1124A	1124A	1124A	2	
1143A	1143A	1143A	1143A	4	Tone PL
1144A	1144A	1144A	1144A	4	
1164A	1164A	1164A	1164A	6	
1184A	1184A	1184A	1184A	8	
3112A	---	3112A	---	1	
3113A	3113A	3113A	3113A	1	
3114A	3114A	3114A	3114A	1	
3122A	---	3122A	---	2	
3123A	3123A	3123A	3123A	2	
3124A	3124A	3124A	3124A	2	
3143A	3143A	3143A	3143A	4	
3144A	3144A	3144A	3144A	4	
3154A	3154A	3154A	3154A	5	
3164A	3164A	3164A	3164A	6	
3184A	3184A	3184A	3184A	8	

Related Publications Available Separately:

Operating Instructions . . . . . 68P81012C50

Theory/Maintenance Manual . . . . . 68P81012C55

Digital PL (Model A) Supplement . . . . . 68P81018C45

Digital PL (Model B) Supplement . . . . . 68P81018C40

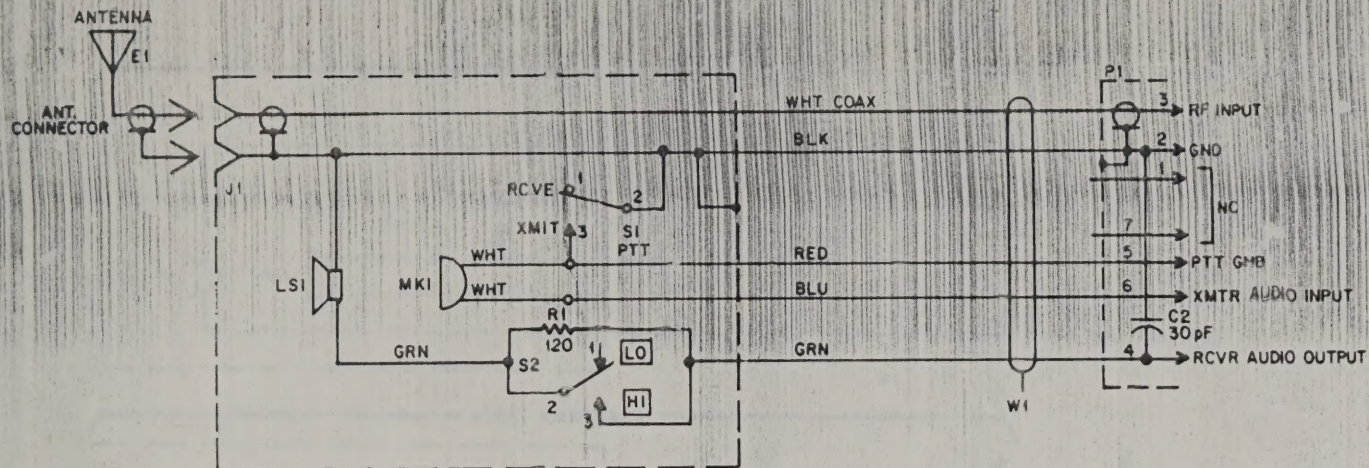
Service Manual

68P81012C58-B

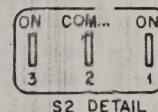
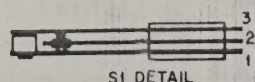




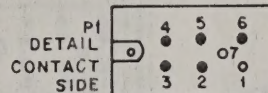




NOTE:  
INSIDE OF SPEAKER-MICROPHONE HOUSING IS ELECTRICALLY CONDUCTIVE.  
COAXIAL SHIELD OF CABLE IS ELECTRICALLY GROUNDING TO SHROUD.



MODELS	SUFFIX
NMN6083A	1



6388:102C50-A

NMN6083A External Speaker-Microphone-Antenna PLF-1251-B

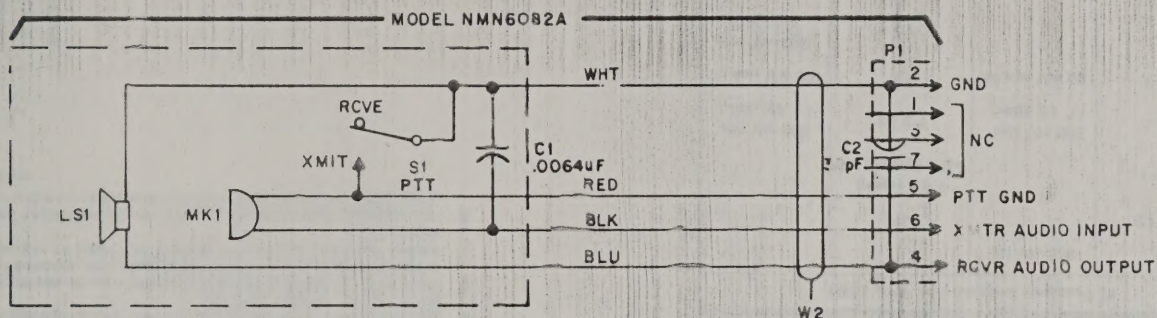
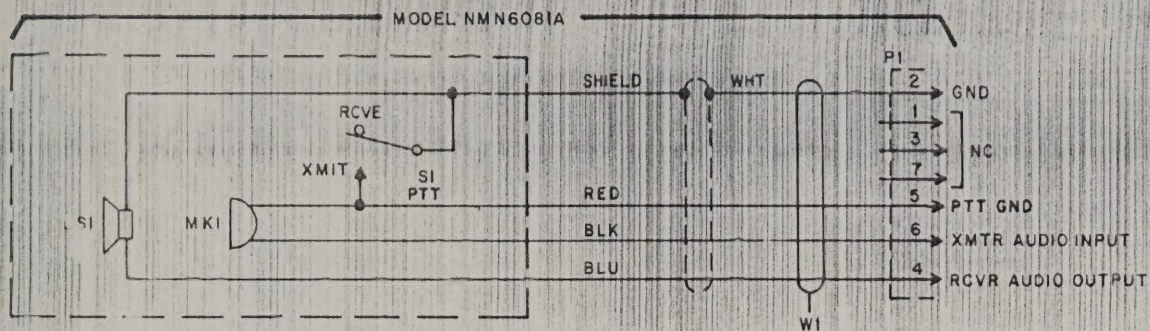
REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
E1*	NAE6132A	ANTENNA: ANTENNA, Helical; 440-470 MHz
	NAE6133A	ANTENNA, Helical; 470-512 MHz
C2	2182358G95	CAPACITOR: 30 pF $\pm 10\%$ ; 75 V; N 50
J1	0905261B01	JACK: Connector, RF
LS1	5083466D02	SPEAKER, Dynamic 2", 300-3500 Hz, res: 39 $\Omega$ $\pm 10\%$
MK1	5082162D01	MICROPHONE: Cartridge; res: 585 $\Omega$ , imped: 1650 $\Omega$ @ 1 kHz
P1	2805646F02	PLUG: Connector, 7-contact
R1	0600125A27	RESISTOR, Fixed: 120 $\Omega$ $\pm 5\%$ ; 1/2 W
S1 S2	4084289H01	SWITCH: PTT, SPDT
	4082085J03	Toggle, SPDT
W1	3005652F01	CABLE: Multi-Conductor

\* Not part of PSR Speaker-Microphone Kit, order separately

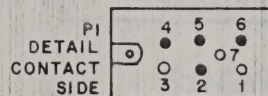








MODELS	SUFFIX
NMN6081A	1
NMN6082A	1



63B81102C46-B

Speaker-Microphone Kits:  
NMN6081A Straight Cord  
NMN6082A Coiled Cord

PLF-1238-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C1	2184098H05	<u>CAPACITOR, Fixed:</u> .0064 uF $\pm 10\%$ ; 50 V (NMN6082A only) 30 pF $\pm 10\%$ ; 75 V; N750
C2	2182358G95	
LS1	5005334D01	<u>SPEAKER, Dynamic:</u> 39 $\Omega$ , 2-inch diameter
MK1	5982575J02	<u>MICROPHONE:</u> Miniature; Res: 700 $\Omega$ , Imped: 5000 $\Omega$ $\pm 30\%$
P1	2805646F02	<u>PLUG:</u> Connector, 7-contact
S1	4082159D02	<u>SWITCH:</u> Micro; PTT, SPDT
W1	3084048H02	<u>CORD:</u> Straight, 48"
W2	3084123H02	







## TEST MEASUREMENTS

PIN	ENCODE	DC VOLTS	AC VOLTS	DC VOLTS	AC VOLTS
NO.	DC VOLTS	AC VOLTS	PL Processor and Low Pass Filter U501		
2	---	250 mV (3)	---	---	---
3	<1.5	15	<0.6 (open) >0.8 (closed) (1)	7.2 (2)	350 mV rms (->.15 dBm)
5	---	---	---	---	---
7	7.4	100 mV rms (->.15 dBm)	80 mV rms (3)	1.7	160 mV rms (3)
8	1.7	---	---	---	---
9	---	---	---	---	---
10	<3.8	---	---	>3.8	280 mV rms (typical)
11	7.5	---	---	7.5	---

Test measurements are nominal. DC voltages are with 15 VDC power supply, and AC voltages are with radio fully quieted and 500 Hz deviation on generator. PL switch is on or off and no carrier input.

Numbers in ( ) refer to the following notes:

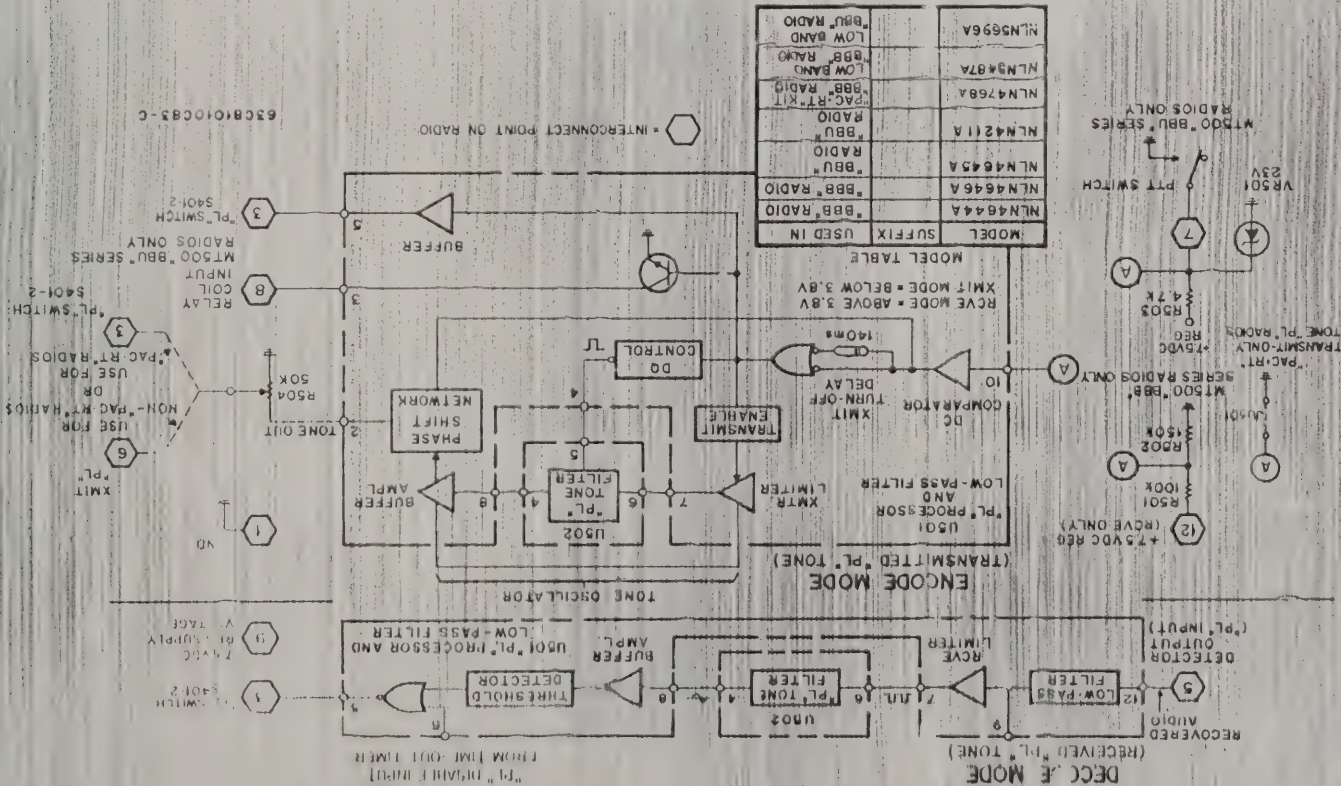
(1) switch on (4):

(2) No modulation; radio fully quieted.

(3) Depends upon PL Tone Filter US02.

1. SET THE "PL" SWITCH OFF (↓).
  2. TURN THE "PL" SWITCH ON (↑), AND APPLY AN ON-FREQUENCY CARRIER SIGNAL FROM THE SIGNAL GENERATOR. MODULATE THE SIGNAL GENERATOR WITH THE PROPER "PL" TONE, AT 50 KHZ DEVIATION.
  3. THE SQUELCH CIRCUIT SHOULD "OPEN" WHEN THE SIGNAL GENERATOR OUTPUT IS INCREASED ABOVE 0.18  $\mu$ V (VHF) OR 0.25  $\mu$ V (UHF).
- EPP-7867-0

"PL" SQUELCH SENSITIVITY CHECK



0-EPF-7867-0

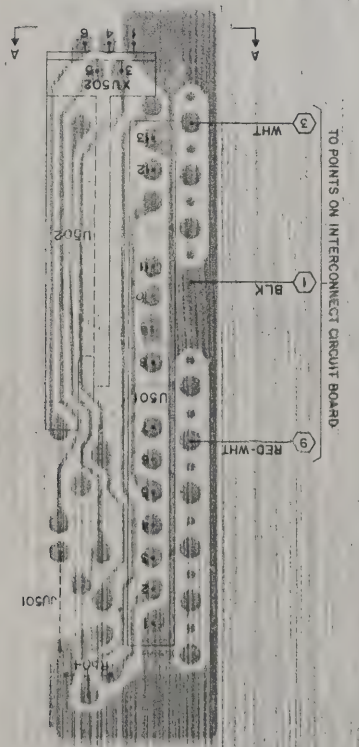
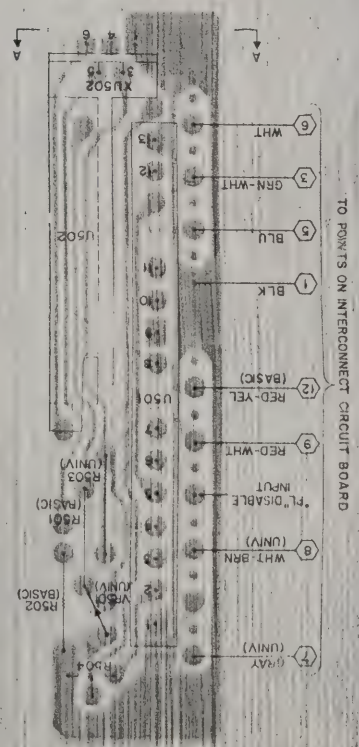






NLN4211A, NLN4644A,  
NLN4645A, NLN4768A

NLN4768A



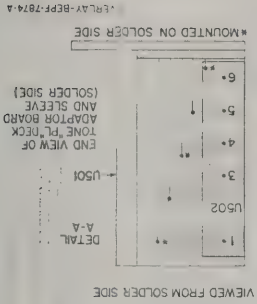
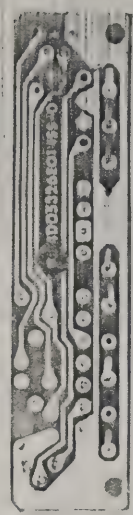
Tone PL Decks  
NLN4211A "BBU" Series Extended Frame  
NLN4644A "BBB" Series Short Frame  
NLN4645A "BBU" Series Short Frame  
NLN4646A "BBB" Series Extended Frame  
NLN4768A "BBB" Series Extended Frame (PAC-RT)  
NLN5487A "BBB" Series Extended Frame (Low Band)  
NLN5696A "BBU" Series Extended Frame (Low Band) PLF-1243-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R501	0600185C04	RESISTOR, Fixed: 100 k $\pm 10\%$ ; 1/8 W (NLN4644A, NLN4645A, & NLN5487A)
R502	0600185C06	150 k $\pm 10\%$ ; 1/8 W (NLN4644A, NLN4645A, & NLN5487A)
R503	0600185B8	4.7 k $\pm 1\%$ ; 1/8 W (NLN4211A, NLN4644A, & NLN5696A)
R504	1805501C04	Pol., 50 k
U501	5105177D23	INTEGRATED CIRCUIT: PL Processor and Low-Pass Filter
U502	NFN6010A	PL Tone Filter (Not part of Tone PL Decks)
VR501	4883461E26	DIODE: See Note 23 V Zener (NLN4211A, NLN4645A, & NLN5696A)

NOTE: For optimum performance, order replacement diodes by Motorola part number only.

EXTENDED FRAME

SHORT FRAME









EPF-8120-O

EEPF-7819 E







# PARTS LIST

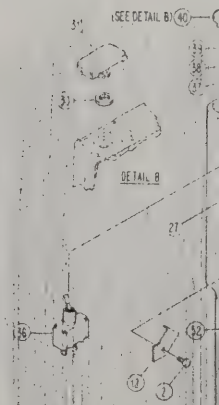
Exploded View Parts List

PLF-1306-B

ITEM NO.	NOMENCLATURE	MOTOROLA PART NO.
1	COVER, Front, Extended	1505660D01
2	SCREW, Mach(2-56x1/3 Phl-Pan)	0300138651
3	PAD, Mic	3505450B01
4	GASKET, Mic	7505577F01
5	CARTRIDGE, Mic	5932575J02
6	PAD, Clamp	7532745J01
7	BRACKET, Mic	0705672D01
8	WASHER, Spring	0405314E01
9	CLOTH, Felt Grill	3505370C01
10	SPEAKER	5005334D01
11	CLAMP, Speaker	4205670D01
12	CLAMP, Speaker	4205671D01
13	RECEPT, Conn Assy CS	0105956C87
14	STRAP, Contact, Neg	4205573A01
15	STRAP, Co. act, Sen	4205575A01
16	STRAP, Cor. act, Charge	4205283E01
17	STRAP, Contact	4205576A01
18	INSULATOR, Contact	1405282E01
19	STRAP, Contact, Fns	4205269G01
20	STRAP, Contact, Pos	4205270G01
21	FUSE	6505214E01
22	RECTIFIER, Silicon	4882466H13
23	INSULATOR, Paper	1405547G02
24	NAMEPLATE	3305537E01
25	Not Used	
26	INSULATOR, Speaker	1405311G01
27	ADHESIVE, Silicone Rubber	1110019A88
28	LABEL, Patent	1305436E01
29	LABEL, FCC	54865436
30	GASKET, Plug	3205315E01
31	PLUG, Cover	3805115E01
32	RECEPT, Conn Assy PL	0105958C87
33	INSULATOR, Speaker	1405311G01
34	TAPE, Insulator	1110003E58
35	INSULATOR, Paper	1482392E05
36	SWITCH, Toggle, SPDT	4005061E01
37	GASKET, "O" Ring	3205082E01
38	WASHER, Special	0405081E01
39	NUT, Mtg	0205050E03
40	ESCUTCHEON, Switch	1305057E01
41	KNOB, Switch	3605114E01
42	SCREW, Set	0383174C04
43	COVER, Battery	1505697D01
44	BUTTON	3805908D01
45	WASHER	0405910D01
46	WASHER, Spring	0405316E01
47	LATCH	5505907D01
48	PAD	7505083E01
49	Not Used	
50	Not Used	
51	COVER, Rear	1505943D01
52	Not Used	
53	PAD, Cover	7505533F01
54	WASHER, Set	0484345A06
55	SCREW, Cap.ve	0305662D11
56	Not Used	
57	Not Used	
58	Not Used	
59	LATCH Assy	NLN4182A
60	"O" Ring	3205082E06
61	INTERCONNECT Bd Assy	
62	SCR, Mach(#2-56x3/16 Phl Pan)	0300138661
63	SCR, Mach(#2-56x1/4 Slot Fit Hd)	0300138661
64	FRAME, Long	705640D03
65	GASKET, Frame	3205520G01
66	PUSH B, Cover Mtg	4305661D01
67	POT, Cermet	1805055E01
68	POT, Cermet Alternate	1805333E01
69	NUT, Special	0282653D03
70	POTENTIOMETER, Control Sw.	1805370E01
71	JACK, Micro	0905657G01
72	BUSHING, Shoulder	4305052E02
73	NUT, Special	0205050E01
74	SHIELD, Antenna	2605054E01
75	LEVER	4505784D01
76	SPRING, Actuator (PTT)	4105783D03
77	GASKET (PTT)	3205378C01
78	CONTACT, Disc (PTT)	3905196G01
79	CONTACT, Feed-Thru (PTT)	3905195G01
80	SPRING, Compression (PTT)	4105267E01
81	SEAL "O" Ring	3205082E02
82	PIN, Spring	2205084E01
83	WASHER, Insert	0405249F01
84	SCREW, Set	0305246E01
85	INSERT, Threaded	4305781D01
86	STUD	4605154E01
87	WASHER, Stud	0405248E01

ITEM NO.	NOMENCLATURE	MOTOROLA PART NO.
88	PIN, Contact	3905456F01
89	GASKET, "O" Ring	3205082E03
90	SPRING, Compression	4105424F01
91	RING, Retaining	4205443E02
92	RECEPTACLE	0905677D01
93	SCR, Mach(#0-80x1/8 Fdl Hd)	0300134684
94	CONTACT	4105197G03
95	BLOCK	4205072E01
96	CONTACT	4105197G01
97	WASHER	0400134190
98	SCREW, Mach(#2-56 x 3/16 SST)	0300138661
99	SEAL "O" Ring	3205661G01
100	ADHESIVE, RTV Silicone Rubber	1110019A88
101	SEALANT, Compound	1110019A63
102	SWITCH, Rotary, 4 freq	4005119E01
	or SWITCH, Rotary, 5 freq	4005119E02
	or SWITCH, Rotary, 6 freq	4005053E03
	or SWITCH, Rotary, 8 freq	4005053E01
103	NUT Special	0282653D05
104	WASHER, Rubber	7583562H02
105	BUSHING, Insulator	4305051E01
106	WASHER, Insulated	0400474215
107	SCREW, Jack	0310129A24
108	KNOB, Control	3605927D05
109	SCREW, Latch	
110	GLYPHOL	1100008675
111	WASHER, Nylon	0405735F01
112	KNOB, Vol	3605927D01
113	KNOB, Squelch	3605927D03
114	SCREW, Set	0383174C02
115	WASHER, Latch	0400120581
116	ANTENNA, Telescopic(2 Section)	8505550E01
117	ANTENNA, Telescopic(5 Section)	8505549E01
118	ANTENNA, Telescopic(6 Section)	8505762A01
119	ESCUTCHEON, 4 freq	1305621D09
120	ESCUTCHEON, 5 freq	1305621D05
121	ESCUTCHEON, 6 freq	1305621D15
122	ESCUTCHEON, 8 freq	1305621D07
123	Not Used	
124	SCREW, Captive	0305864D01
125	TRANSCEIVER Bd. Assy ("BBU" Series)	NUE6231A NUE6232A NUE6233A NUE6272A NUE6281A NUE6282A NUE6283A NUE6302A NUE6312A NUE6313A
126	Not Used	
127	Not Used	
128	TRANSCEIVER Bd. Assy ("BBB" Series)	NUE6242A NUE6243A NUE6292A NUE6293A
129	INTERCONNECT Bd. Assy	
130	Not Used	
131	SCREW, Special	0305525G01
132	WASHER	0400140015
133	BRACKET, Switch	0705261E01
134	EYELET	0505095E09
135	NUT	0200400B65
136	SWITCH, Micro	4005265E01
137	Not Used	
138	NUT, PTT	0205250E01
139	SPRING, PTT	4105252E01
140	ACTUATOR, PTT	4705251E01
141	GASKET, Switch	3205077E01
142	COVER, Receptacle	1505212E01
143	SPRING, Actuator	4106783D
144	Not Used	
145	PLATE, Information	6405538E01
146	HOUSING, Sleeve, Extended	1505858D02
147	ADHESIVE, RTV Silicone Rubber	1110019A88
148	GASKET, Frame	3205520G01
149	CLIP, Antenna	4205860D01
150	WASHER, Spring	0405314E03
151	SCREW, Special	0305044E01
152	HOUSING, Sleeve	1505858D01
153	MACH. Screw(2-56x3/8 Slot Bind)	0300136745
154	LK Wash (#2 Split)	0400400139
155	NUT (#2 Hex)	0200115676
156	POST, Guide	4605798E01
157	NUT	0205797E01
158	CLIP, Option Bd.	4205445E04
159	CLIP, Option Bd.	4205445E01
160	CLIP, Option Bd.	4205445E02
161	CLIP, Option Bd.	4205445E01

ITEM NO.	NOMENCLATURE
162	SCREW, Guide
163	CLIP, Option Bd.
164	CTR Deck
165	ONE PL Deck
166	DPL & IPL Deck
167	OPTION Deck (Tone PL)
168	OPTION Deck (Digital PL)
169	OPTION Deck (Selective Call)
170	OPTION Deck (Single-Tone)
171	TIME Out Timer
172	SEL Call (4 Tone)
173	SEL Call (Long Tone)
174	MULTI Single-Tone
175	C8R8 Deck















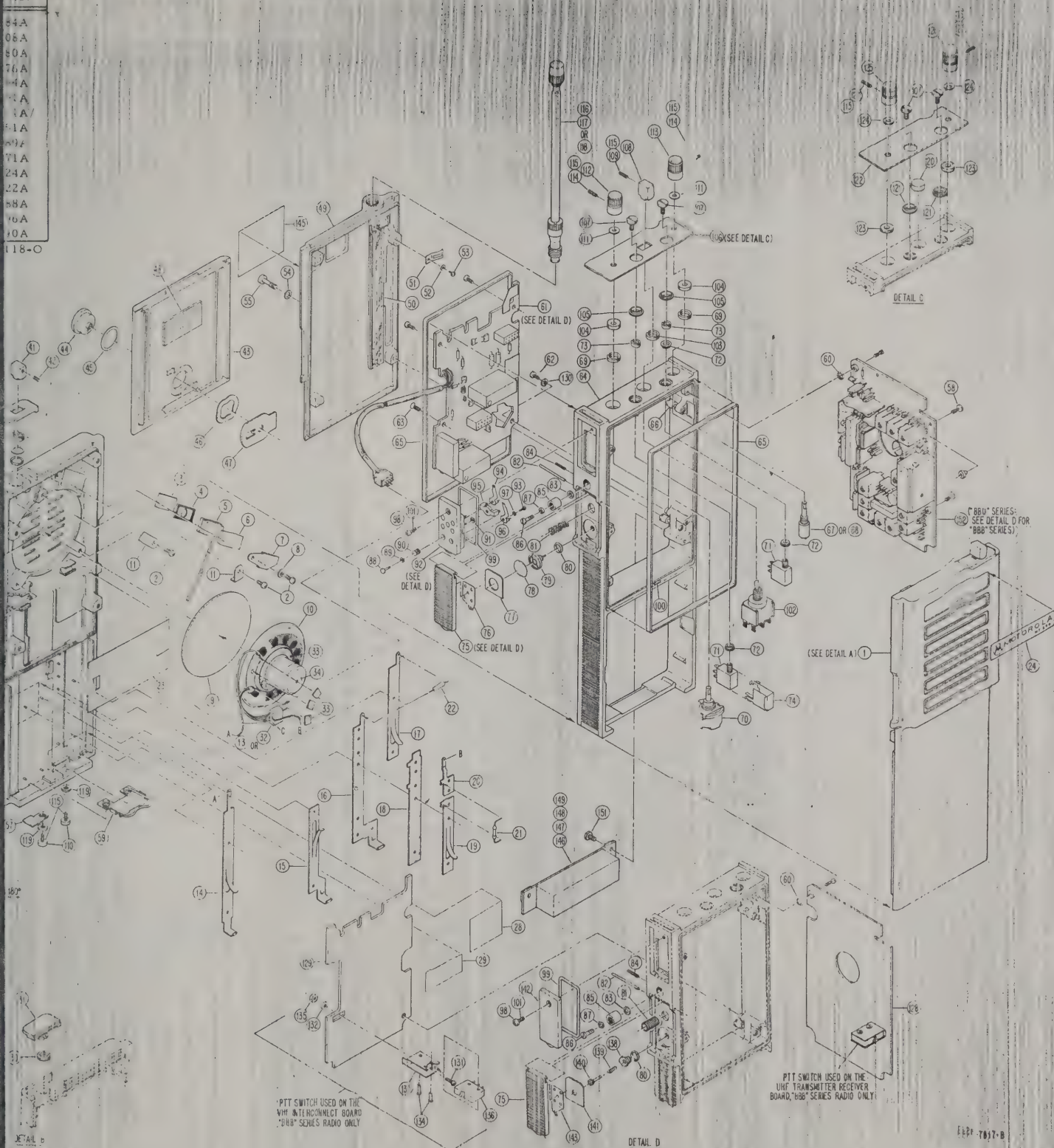






NO.

94A  
08A  
90A  
76A  
44A  
4A/  
51A  
69A  
71A  
24A  
22A  
98A  
76A  
70A  
118-O



SLIM-LINE, EXTENDED  
C1R1, C2R2





# PARTS LIST

Exploded ew Parts List

PLF-1304-B

ITEM NO.	NOMENCLATURE	MOTOROLA PART NO.
1	COVER, Front, Extended	1505660D01
2	SCREW, Mach 2-56x1/8Phl Pan	0300138651
3	PAD, Mic	3505450B01
4	GASKET, Mic	7505577F01
5	CARTRIDGE, Mic	5982575J02
6	PAD, Clamp	7582745J01
7	BRACKET, Mic	0705672D01
8	WASHER, Spring	0405314E01
9	CLOTH, Felt Grill	3505370C01
10	SPEAKER	5005334D01
11	CLAMP, Speaker	4205670D01
12	CLAMP, Speaker	4205671D01
13	RECEPT, Conn Assy (PL)	0105958C86
14	STRAP, Contact, Neg	4205573A01
15	STRAP, Contact, Sen	4205575A01
16	STRAP, Contact, Charge	4205283E01
17	STRAP, Contact	4205576A01
18	INSULATOR, Contact	1405282E01
19	STRAP, Contact, Pos	4205269G01
20	STRAP, Contact, Pos	4205270G01
21	FUSE	6505214E01
22	RECTIFIER, Silicon	4882466H13
23	INSULATOR, Paper	1405447G02
24	NAMEPLATE	3305537E01
25	Not Used	
26	Not Used	
27	ADHES, Silicone Rubber	1110019A88
28	LABEL, Patent	1305436E01
29	LABEL, FCC	5400865436
30	GASKET, Plug	3205315E01
31	PLUG, Cover	3805115E01
32	RECEPT, Conn Assy CS	0105958C87
33	INSULATOR, Speaker	1405311G01
34	TAF, Insulator	1110003E58
35	INSULATOR, Paper	1482392E05
36	SWITCH, Toggle, SPDT	4005061E01
37	GASKET, "O" Ring	3205082E01
38	WASHER, Special	0405081E01
39	NUT, Mtg	0205050E03
40	ESCUTCHEON, Switch	1305057E01
41	KNOB, Switch	3605114E01
42	SCREW, Set	0383174C04
43	COVER, Battery	1505697D01
44	BUTTON	3805908D01
45	WASHER	0405910D01
46	WASHER, Spring	0405316E01
47	LATCH	5505907D01
48	PAD	7505083E01
49	COVER, Rear, Extended (SL)	1505039E01
50	SHIELD, Antenna Tube	2605045E01
51	CLIP, Antenna	4205860D01
52	WASHER, Spring	0405314E03
53	SCREW, Antenna Clip	0305044E01
54	WASHER, Seal	0484345A06
55	SCREW, Captive	0305662D09
56	Not Used	
57	INSULATOR, Contact	1405359A01
58	SCREW, Captive	0305864D01
59	LATCH Assy	NLN4181A
60	"O" Ring	3205082E06
61	INTERCONNECT Bd. Assy	
62	SCR, Mach (#2-56x3/16Phl Pan)	0300138661
63	SCR, Mach (#2-56x1/4Slot Flt Hd)	0300136666
64	FRAME, Extended	0705640D03
65	GASKET, Frame	3205520G01
66	BUSHING, Cover	4305661D01
67	POT, Cermet	1805055E01
68	POT, Cermet Alternate	1805333E01
69	NUT, Special	0282653D03
70	POTENTIOMETER, Control Sw	1805370E01
71	JACK, Micro	0905657G01
72	BUSHING, Shoulder	4305052E02
73	NUT, Special	0205050E01
74	SHIELD, Antenna	2605045E01
75	LEVER	4505784D01
76	SPRING, Actuator (PTT)	4105783D03
77	GASKET (PTT)	1205578G01
78	CONTACT, Disc (PTT)	3905196G01
79	CONTACT, Feed-Thru (PTT)	3905196G01
80	SEAL "O" Ring	3205082E01
81	SPRING, Compression (PTT)	4105267E01
82	PIN, Spring	2205084E01
83	WASHER, Insert	0405314E01
84	SCREW, Set	0305214E01
85	INSERT, Threaded	4305781D01
86	STUD	4605154E01
87	WASHER, Stud	0405248E01

ITEM NO.	NOMENCLATURE	MOTOROLA PART NO.
88	PIN, Contact	3905456E01
89	GASKET, "O" Ring	3205082E01
90	SPRING, Compression	4105267E01
91	RING, Retaining	4205463E02
92	RECEPTACLE	0705677D01
93	SCREW (#0-80x1/8 Flt Hd)	0300139684
94	CONTACT	4105197G03
95	BLOCK	4605072E01
96	CONTACT	4105197G01
97	WASHER	0400134190
98	SCR, Mach (#2-56x3/16 SST)	0300138661
99	SEAL "O" Ring	3205661G01
100	ADHESIVE, RTV Silicone Rubber	1110019A63
101	SEALANT, Compound (PURP)	1110019A63
102	SWITCH, Toggle	4005120E01
103	NUT, Special	0282653D07
104	PAD, Rubber	7583562H02
105	BUSHING, Insulator	4305051E01
106	ESCUTCHEON, 2 freq	1305621D03
107	SCREW, Jack	0310129A24
108	KNOB, Switch	3605114E01
109	SCREW, Set	0383174C04
110	SCREW, Latch	0300139982
111	WASHER, Nylon	0405935F01
112	KNOB, Vol	3605927D01
113	KNOB, Squelch	3605927D03
114	SCREW, Set	0383174C02
115	GLYPTOL	1100008675
116	ANTENNA, Telescopic	8505550E01
117	ANTENNA, Telescopic (5 Section)	8505549E01
118	ANTENNA, Telescopic (6 Section)	8505509E01
119	WASHER, Latch	0400120581
120	PAD, Rubber	7583562H01
121	BUSHING, Insulating	4305051E01
122	ESCUTCHEON	1305621D01
123	PAD, Rubber	7583562H02
124	WASHER, Nylon	0405935F01
125	KNOB, Vol	3605927D01
126	KNOB, Squelch	3605927D03
127	SCREW, Set	0383174C02
128	TRANSCIVER Bd. Assy ("BBB" Series)	NUE6242A NUE6243A NUE6292A NUE6293A
129	INTERCONNECT Bd. Assy	
130	WASHER, Insulated	0400474215
131	SCREW, Special	0305525G01
132	WASHER	0400140015
133	BRACKET, Switch	0705261E01
134	EYELET	0505095E01
135	NUT	0200400865
136	SWITCH, Micro	4005265E01
137	Not Used	
138	NUT, PTT	0205250E01
139	SPRING, PTT	4105252E01
140	ACTUATOR, PTT	4705251E01
141	GASKET, Switch	3205077E01
142	COVER, Receptacle	1505212E01
143	SPRING, Actuator	4105783D01
144	Not Used	
145	PLATE, Information	6405538E01
146	OPTION Deck (Tone PL)	NLN4211A NLN4646A
147	OPTION Deck (Digital PL)	NLN4212A
148	OPTION Deck (Selective Call)	NLN4213A
149	OPTION Deck (Single-Tone)	NLN4723A
150	Not Used	
151	SCREW, Hex (#2-56x3/16)	0305493F01
152	TRANSCIVER Bd. Assy ("BBU" Series)	NUE6231A NUE6232A NUE6233A NUE6272A NUE6281A NUE6282A NUE6283A NUE6302A NUE6312A NUE6313A

ITEM(S)	P/O KIT NO.
1 thru 29 & 36 thru 41	NLN4184
1 thru 31	NLN4183
43 thru 48	NLN4189
49 thru 58	NLN4197
57	NLN4194
60 thru 101	NHD6091
60 thru 75, 80 thru 84	NHD6091
98 thru 103, & 130 thru 144	NHD6091
104 thru 115	NLN4181
116	NAE6271
117	NAD6324
118	NAD6322
119 thru 127	NLN4188
145	NLN4196
151	NLN4190

EPF-8111



DETAIL "X" ROTATED 180°



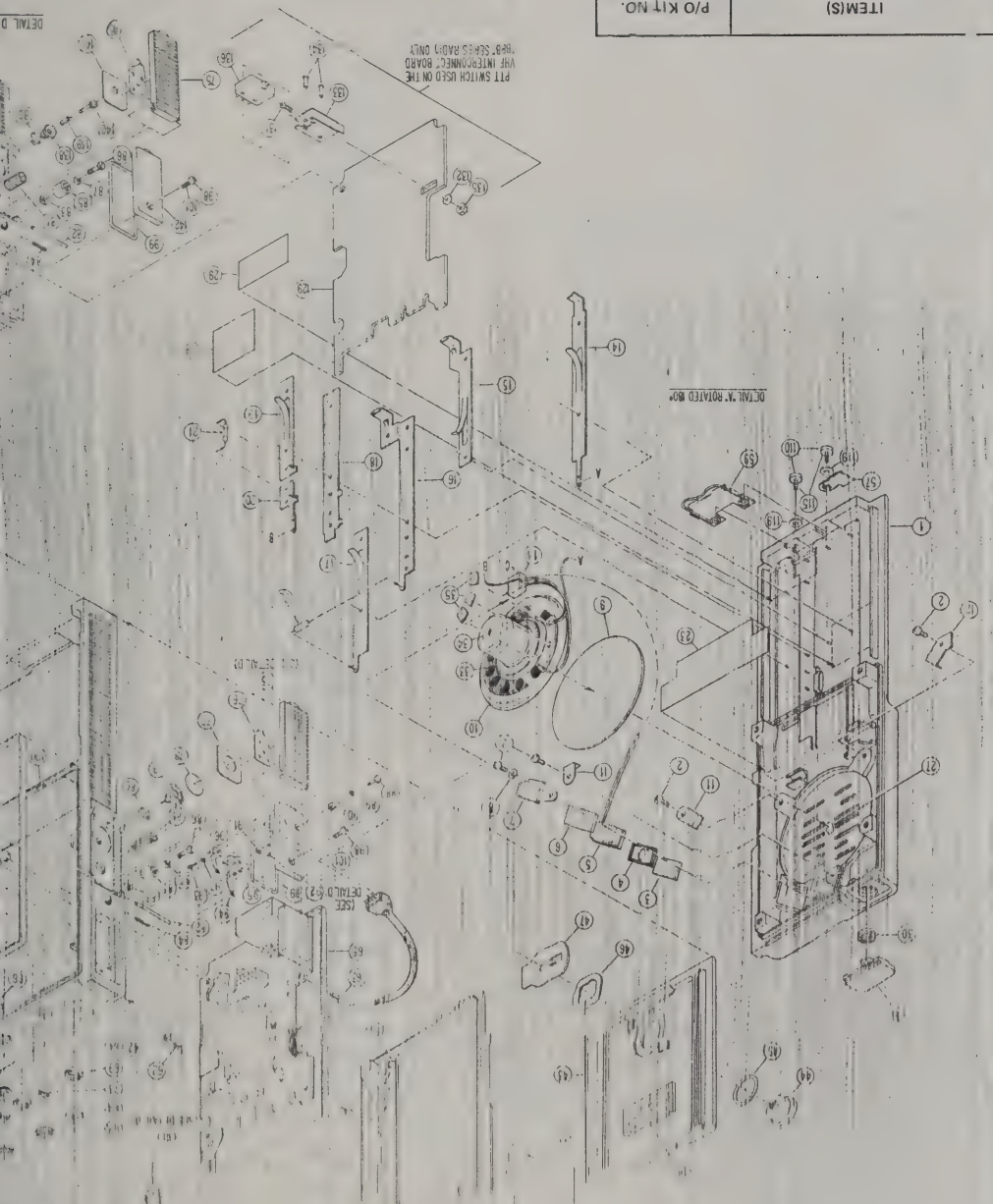








DETAIL D



EPF-8117-0

ITEM(S)	P/O KIT NO.
1 thru 31	NLN4207A
1 thru 30 & 36 thru 42	NLN4183A
43 thru 48	NLN4180A
49 thru 55	NLN4194A
61 thru 101	NHD6081A
61 thru 103	NHD6001A
61 thru 75, 80 thru 84,	NHD6011A/
98 thru 103, & 130 thru 144	NHD6041A
104 thru 115	NLN4189A
116	NAD6271A
117	NAD6324A
118	NAD6322A
119 thru 127	NLN4188A

1	RTM, Contact	3905430E01
2	GASKET, "O" Ring	3205002E01
3	RING, Retaining	4205444E02
4	WASHER, Compression	4105444E01
5	WASHER, Mach(#2-56x3/16 SST)	0300138661
6	SEAL, "O" Ring	3205661G01
7	ADHESIVE	1110019A8
8	SEALANT, Compound (PURP)	1110019A6
9	SWITCH, Toggle	4005120E01
10	NUT, Special	0282653D07
11	PAD, Rubber	7583562H02
12	BUSHING, Insulator	4305051E01
13	ESCUTCHEON, 2 Tree	1305621D03
14	SCREW, Jack	0310129A24
15	KNB, Switch	3605114E01
16	SCREW, Set	03831174C04
17	SCREW, Latch	0300139982
18	WASHER, Nylon	0405935F01
19	KNB, Vol	3605927D01
20	KNB, Squeech	3605927D03
21	SCREW	03831174C02
22	GLYPID	1100008675
23	ANTENNA, Telescope (2 Section)	8505550E01
24	ANTENNA, Telescope (5 Section)	8505549E01
25	ANTENNA, Telescope (6 Section)	8505509E01
26	WASHER, Latch	0400120581
27	PAD, Rubber	7583562H01
28	BUSHING, Insulating	4305051E01
29	ESCUTCHEON, 1 Tree	1305621D01
30	PAD, Rubber	7583562H02
31	WASHER, Nylon	0405935F01
32	KNB, Vol	3605927D01
33	KNB, Squeech	3605927D03
34	SCREW, Set	03831174C02
35	TRANSCIEVER Bd Assy	03831174C02
36	SCREW, Set	03831174C02
37	TRANSCIEVER Bd Assy	03831174C02
38	TRANSCIEVER Bd Assy	03831174C02
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100	TRANSCIEVER Bd Assy	03831174C02
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109	TRANSCIEVER Bd Assy	03831174C02
110	TRANSCIEVER Bd Assy	03831174C02
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112	TRANSCIEVER Bd Assy	03831174C02
113	TRANSCIEVER Bd Assy	03831174C02
114	TRANSCIEVER Bd Assy	03831174C02
115	TRANSCIEVER Bd Assy	03831174C02
116	TRANSCIEVER Bd Assy	03831174C02
117	TRANSCIEVER Bd Assy	03831174C02
118	TRANSCIEVER Bd Assy	03831174C02
119	TRANSCIEVER Bd Assy	03831174C02





ITEM NO.	NOMENCLATURE	MOTOROLA PART NO.
1	COVER, Front, Extended	1505633D01
2	SCREW, Mach(2-56x1/8 Phil Pan)	0300138651
3	PAD, Mnt	7505577F01
4	PAD, Mnt	7505577F01
5	CARTRIDGE, Mic	5982575J02
6	PAD, Clamp	7582745J01
7	BRACKET, Mnt	0705672D01
8	WASHER, Spring	0405314E01
9	CLOTH, Filt Grit	3905370C01
10	SPEAKER	5005334D01
11	CLAMP, Speaker	4205670D01
12	CLAMP, Speaker	4205671D01
13	RECEPT, Conn Assy, FS	0105956C03
14	STRAP, Contact, S	05573A01
15	STRAP, Contact, S	05573A01
16	STRAP, Contact, Charge	05573A01
17	STRAP, Contact	05576A01
18	INSULATOR, Contact, Pos	1405282E01
19	STRAP, Contact, Pos	4205269G01
20	STRAP, Contact, Pos	4205270G01
21	FUSE	6505214E01
22	RECTIFIER, Silicon	4882466H13
23	INSULATOR, Paper	1405547G01
24	NAMEPLATE	3305537E01
25	Not Used	
26	Not Used	
27	ADHES, Silicone Rubber	1110019A88
28	LABEL, Patent	1305436E01
29	LABEL, FCC	5400865436
30	GASKET, Plug	3205115E01
31	PLUG, Cover	3805115E01
32	Not Used	
33	INSULATOR, Speaker	1405311G01
34	TAPE, Insulator	11100033E8
35	INSULATOR, Paper	1482392E05
36	Not Used	
37	Not Used	
38	Not Used	
39	Not Used	
40	Not Used	
41	Not Used	
42	WASHER, Insulated	0400474215
43	COVER, Battery	1505697D01
44	BUTTON	3805908D01
45	WASHER, Button	0405910D01
46	WASHER, Spring	0405316E01
47	LATCH	5505907D01
48	PAD	7505083E01
49	COVER, Rear	1505698D01
50	SHIELD, Antenna Tube	2605045E01
51	CLIP, Antenna	4205680D01
52	WASHER, Spring	050314E03
53	SCREW, Antenna C	0505044E01
54	WASHER, Seal	184345A06
55	SCREW, Caplve	05662D09
56	Not Used	
57	INSULATOR, Contact	1405359E01
58	SCREW, Caplve	0305644D01
59	LATCH Assy	NLN4181A
60	"O" Ring	3205082E06
61	INTERCONNECT Bd, Assy	0300138661
62	SCR, Mach(2-56 x 3/16 Phil Pan)	0300136666
63	SCR, Mach(2-56x1/4 Slot Fil Hd)	0705547D03
64	FRAME, Short	3205520C01
65	GASKET, Frame	4305661D01
66	POT, Cermet	1805055E01
67	POT, Cermet	1805333E01
68	POT, Cermet Alternate	0282653D03
69	NUT, Special	1805370E01
70	POTENTIOMETER, Control Sw	0905657C01
71	JACK, Micro	4305052E01
72	BUSHING, Shoulder	0205050E01
73	NUT, Special	2605054E01
74	SHIELD, Antenna	4105784D01
75	LEVER	4505784D01
76	SPRING, Actuator (PTT)	4105783D03
77	GASKET (PTT)	3205378G01
78	CONTACT, Disc (PTT)	3905196G01
79	CONTACT, Feed-Thru (PTT)	3905195G01
80	SEAL, "O" Ring	3205082E02
81	SPRING, Compression (PTT)	4105267E01
82	PIN, Spring	2205084E01
83	WASHER, Insert	0405249E01
84	SCREW, Set	0305246E01
85	INSERT, Threaded	4305781D01
86	STUD	4605154E01
87	WASHER, Stud	0405248E01

ITEM NO.	NOMENCLATURE	MOTOROLA PART NO.
88	PIN, Contact	3905456E01
89	GASKET, "O" Ring	3205082E03
90	SPRING, Compression	4105442F01
91	RING, Retaining	4205463H02
92	RECEPTACLE	0905677D01
93	SCREW (#0-80 x 1/8 Phil Hd)	0300139684
94	CONTACT	4105197G03
95	BLOCK	4605072E01
96	CONTACT	4105197G01
97	WASHER	0400134190
98	SCR, Mach(2-56 x 3/16 SST)	0300138661
99	SEAL, "O" Ring	3205661G01
100	ADHESIVE	1110019A88
101	SEALANT, Compound (PURP)	1110019A63
102	SWITCH, Toggle	4005120E01
103	NUT, Special	0282653D07
104	PAD, Rubber	7583562H02
105	BUSHING, Insulator	4305051E01
106	ESCUTCHEON, 2 freq	1305621D03
107	SCREW, Jack	0310129A24
108	KNOB, Switch	3605114E01
109	SCREW, Set	0383174C04
110	SCREW, Latch	0300139982
111	WASHER, Nylon	0405935E01
112	KNOB, Vol	3605927D01
113	KNOB, Switch	3605927D03
114	SCREW	0383174C02
115	GLYPHOL	1100008675
116	ANTENNA, Telescopic(2 Section)	8505550E01
117	ANTENNA, Telescopic(5 Section)	8505549E01
118	ANTENNA, Telescopic(6 Section)	8505509E01
119	WASHER, Latch	0400120581
120	PAD, Rubber	7583562H01
121	BUSHING, Insulating	4305051E01
122	ESCUTCHEON, 1 freq	1305621D01
123	PAD, Rubber	7583562H02
124	WASHER, Nylon	0405935E01
125	KNOB, Vol	3605927D01
126	KNOB, Switch	3605927D03
127	SCREW, Set	0383174C02
128	TRANSCEIVER Bd Assy	NUE6231A
129	INTERCONNECT Bd Assy	NUE6232A
130	Not Used	
131	SCREW, Special	0305525C01
132	WASHER	0400140015
133	BRACKET, Switch	0705261E01
134	EYELET	0505095E09
135	NUT	0200400865
136	SWITCH, Mirco	4005265E01
137	Not Used	
138	NUT, PTT	0205250E01
139	SPRING, PTT	4105352E01
140	ACTUATOR, PTT	4705251E01
141	GASKET, Switch	0205077E01
142	COVER, Receptacle	1505212E01
143	SPRING, Actuator	4105783D01
144	PLATE, Information	6405338E01
145	TRANSCEIVER Bd Assy	NUE6242A
	("BHB" Series)	NUE6243A
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		NUE6312A
		NUE6313A

ITEM(S)
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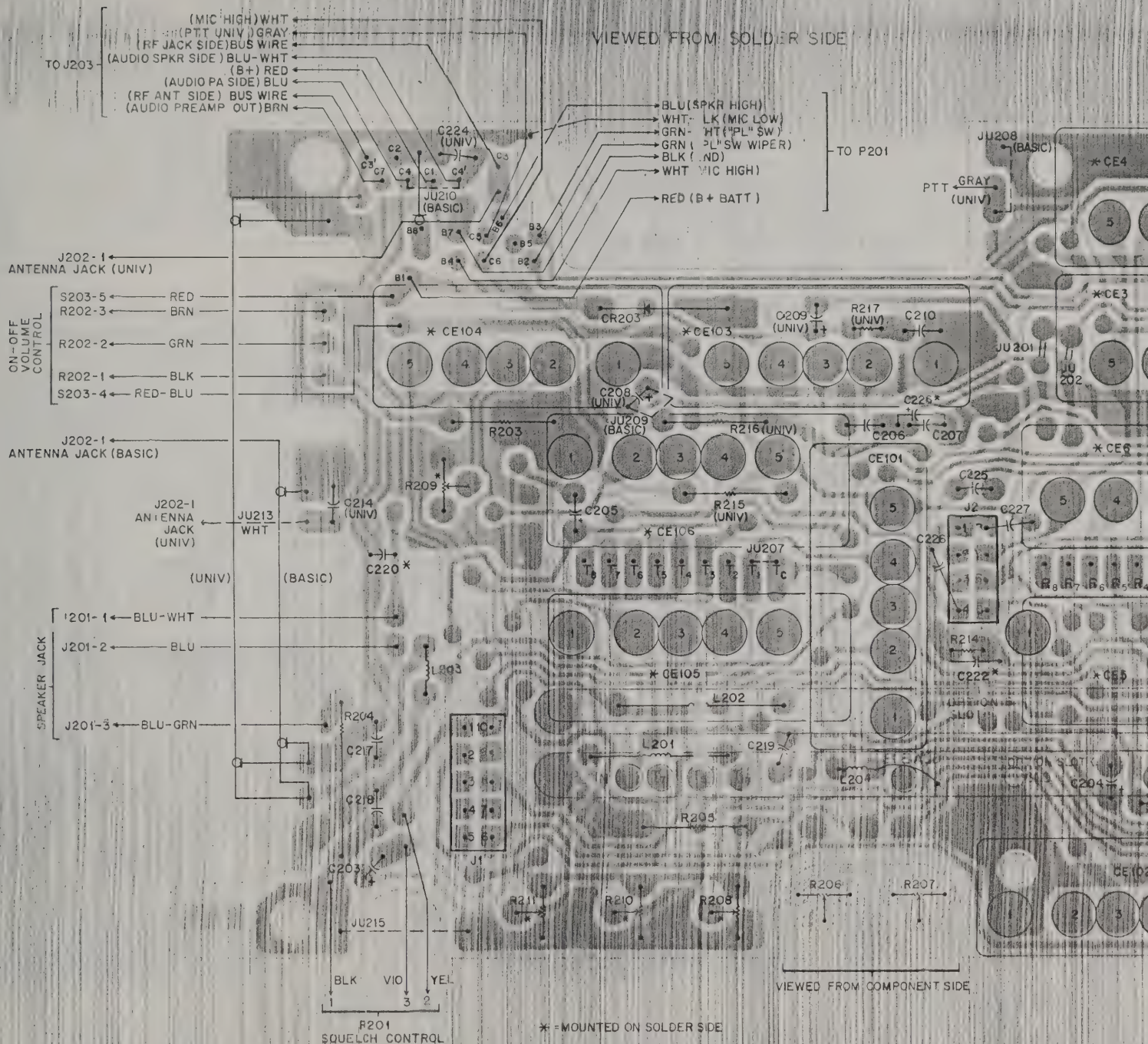












NHE6001A-1 & Later  
NHE6011A-1 & Later  
HE6081A-1 & Later  
NHE6091A-1 & Later

NHE6151A-1 & Later  
NHE6161A-1 & Later  
NHE6021A-1 & Later  
NHE6031A-1 & Later

NHE6041A-1 & Later  
NHE6051A-1 & Later  
NHE6061A-1 & Later  
NHE6071A-1 & Later

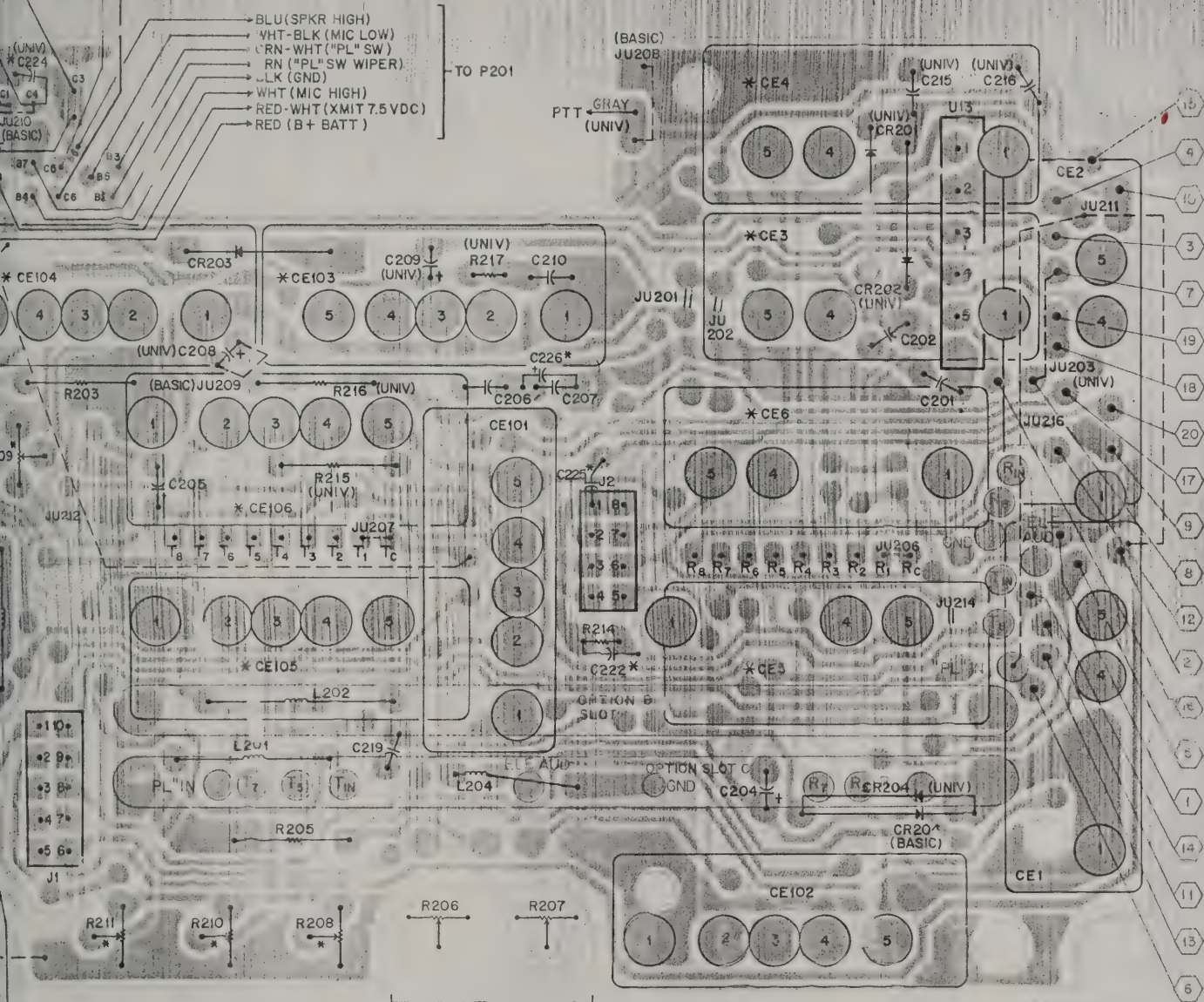
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NHE6121A-1 & Later  
NHE6131A-1 & Later  
NHE6141A-1 & Later

NHE6151A-1 & Later  
NHE6161A-1 & Later





VIEWED FROM SOLDER SIDE



VIEWED FROM COMPONENT SIDE

\* = MOUNTED ON SOLDER SIDE

ANTENNA

ON-OFF  
VOLUME  
CONTROL

ANTENNA

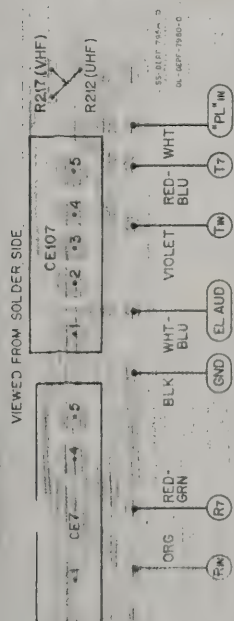
SPEAKER JACK



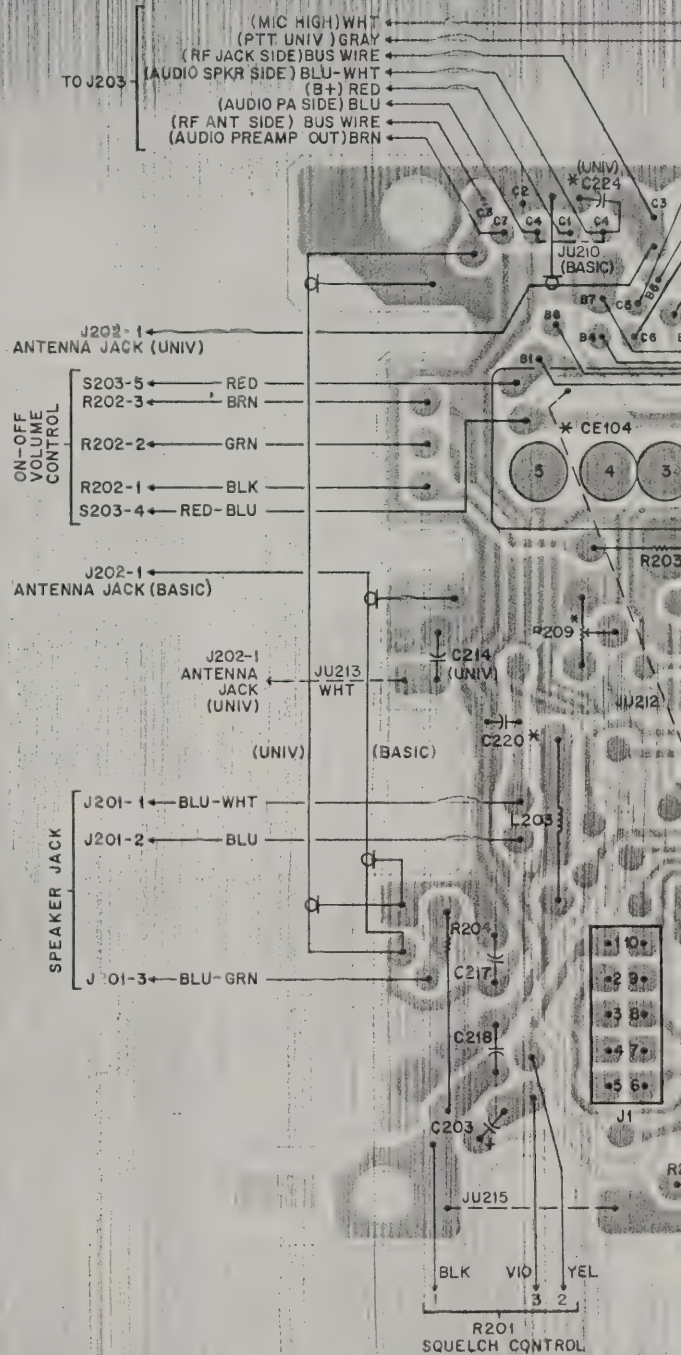
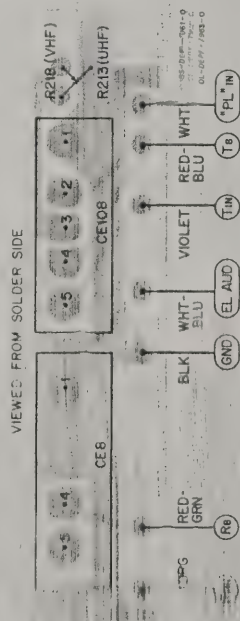


1	GROUND
2	SQUELCH CONTROL VOLTAGE
3	"PL" SWITCH S401-2
4	"PL" SWITCH S401-1
5	DETECTOR OUTPUT
6	TRANSMIT "PL"
7	PTT (UNIVERSAL RADIOS ONLY)
8	RELAY COIL INPUT (UNIVERSAL RADIOS ONLY)
9	+7.5 VDC REGULATED
10	BATTERY B+
11	DETECTOR LIMITER OUTPUT
12	+7.5 VDC REGULATED (RECEIVE ONLY)
13	RECEIVER AUDIO PREAMPLIFIER OUTPUT
14	VOLUME CONTROL, R202-3
15	+7.5 VDC REGULATED (TRANSMIT ONLY)
16	ID TONE INPUT
17	RECEIVER AUDIO POWER AMPLIFIER INPUT
18	(TIE POINT WITH 19)
19	(TIE POINT WITH 18)
20	SPEAKER, J201-2

C7R7 CHANNEL  
ELEMENT DECK



C8 R8 CHANNEL  
ELEMENT DECK

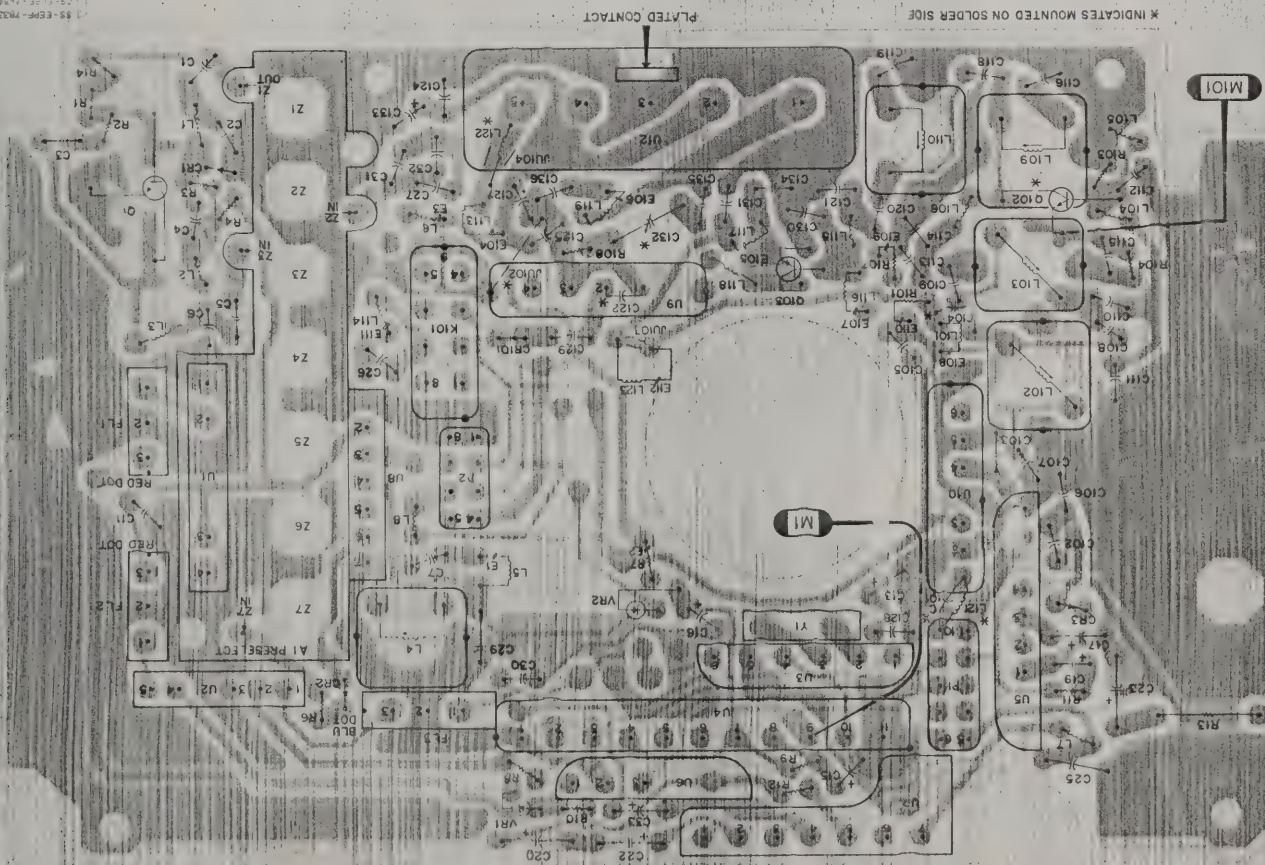


NHE6001A  
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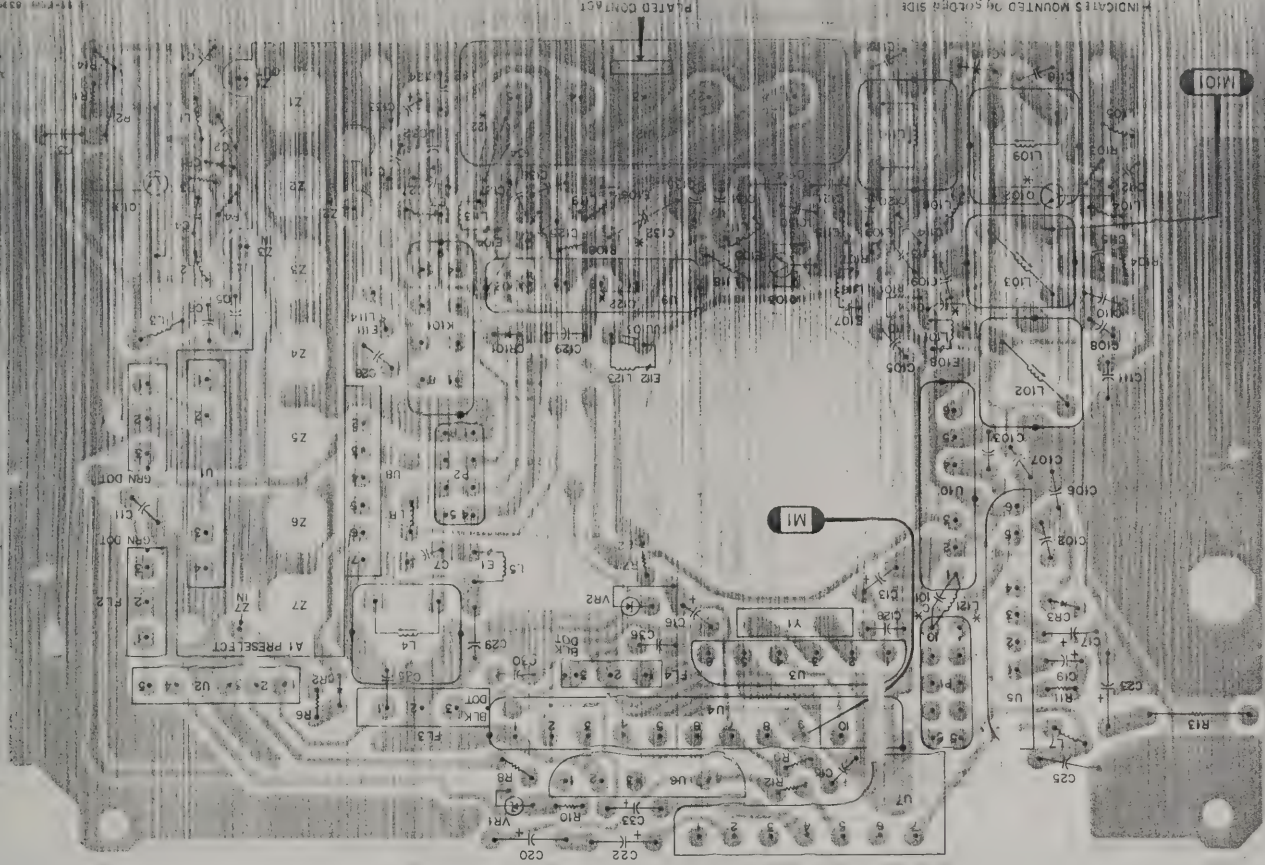




NUE6282A & NUE6283A (Viewed from Solder Side)



NUE6282A & NUE6283A (Viewed from Solder Side)



"BBU" SERIES CIRCUIT BOARD  
DETAIL AND PARTS LIST

\* INDICATES MOUNTED ON SOLDER SIDE

Interconnect
(U4)
(U3)
(U2)
(U1)
(U6)
(U7)
(U8, U10)
(U9)
filter
(U3)
ment diodes
only.
al frequency
1, P12, and
iver can
at Board
62E01-O
2397D12:
EH14











REFERENCE	SYMBOL	DESCRIPTION	MOTOROLA PART NO.	REFERENCE	SYMBOL	DESCRIPTION	MOTOROLA PART NO.	REFERENCE	SYMBOL	DESCRIPTION	MOTOROLA PART NO.	REFERENCE	SYMBOL	DESCRIPTION	MOTOROLA PART NO.	REFERENCE	SYMBOL	DESCRIPTION	MOTOROLA PART NO.
R11	R101	RELAY	8005300E01	L1	L101	COIL, RF; unless stated	2484545H01	C131	C131	2182358G95	2182358G95	C132	C132	2005372C03	2182358G95	C133	C133	2182358G95	2182358G95
R12	R102	1/6 Crystal Can, DPDT	2484545H01	L2	L102	1-1/4 turns around	2484545H01	C134	C134	2182358G95	2182358G95	C135	C135	2182358G95	2182358G95	C136	C136	2182358G95	2182358G95
R13	R103	0.29 uH choke	2484545H01	L3	L103	2-3/4 turns around	2484545H01	C201	C201	2182358G95	2182358G95	C202	C202	2182358G95	2182358G95	C203	C203	2182358G95	2182358G95
R14	R104	1.2 uH choke	2484545H01	L4	L104	Code: CLFAR, 8-1/4 turns	2484545H01	C204	C204	2182358G95	2182358G95	C205	C205	2182358G95	2182358G95	C206	C206	2182358G95	2182358G95
R15	R105	0.085 uH choke	2484545H01	L5	L105	Code: CLFAR, 4-1/2 turns	2484545H01	C207	C207	2182358G95	2182358G95	C208	C208	2182358G95	2182358G95	C209	C209	2182358G95	2182358G95
R16	R106	0.29 uH choke	2484545H01	L6	L106	Code: CLFAR, 2-1/4 turns	2484545H01	C210	C210	2182358G95	2182358G95	C211	C211	2182358G95	2182358G95	C212	C212	2182358G95	2182358G95
R17	R107	0.085 uH choke	2484545H01	L7	L107	Code: CLFAR, 4-1/4 turns	2484545H01	C213	C213	2182358G95	2182358G95	C214	C214	2182358G95	2182358G95	C215	C215	2182358G95	2182358G95
R18	R108	0.29 uH choke	2484545H01	L8	L108	Code: CLFAR, 2-1/4 turns	2484545H01	C216	C216	2182358G95	2182358G95	C217	C217	2182358G95	2182358G95	C218	C218	2182358G95	2182358G95
R19	R109	0.085 uH choke	2484545H01	L9	L109	Code: CLFAR, 4-1/4 turns	2484545H01	C219	C219	2182358G95	2182358G95	C220	C220	2182358G95	2182358G95	C221	C221	2182358G95	2182358G95
R20	R110	0.29 uH choke	2484545H01	L10	L110	Code: CLFAR, 2-1/4 turns	2484545H01	C222	C222	2182358G95	2182358G95	C223	C223	2182358G95	2182358G95	C224	C224	2182358G95	2182358G95
R21	R111	0.085 uH choke	2484545H01	L11	L111	Code: CLFAR, 4-1/4 turns	2484545H01	C225	C225	2182358G95	2182358G95	C226	C226	2182358G95	2182358G95	C227	C227	2182358G95	2182358G95
R22	R112	0.29 uH choke	2484545H01	L12	L112	Code: CLFAR, 2-1/4 turns	2484545H01	C228	C228	2182358G95	2182358G95	C229	C229	2182358G95	2182358G95	C230	C230	2182358G95	2182358G95
R23	R113	0.085 uH choke	2484545H01	L13	L113	Code: CLFAR, 4-1/4 turns	2484545H01	C231	C231	2182358G95	2182358G95	C232	C232	2182358G95	2182358G95	C233	C233	2182358G95	2182358G95
R24	R114	0.29 uH choke	2484545H01	L14	L114	Code: CLFAR, 2-1/4 turns	2484545H01	C234	C234	2182358G95	2182358G95	C235	C235	2182358G95	2182358G95	C236	C236	2182358G95	2182358G95
R25	R115	0.085 uH choke	2484545H01	L15	L115	Code: CLFAR, 4-1/4 turns	2484545H01	C237	C237	2182358G95	2182358G95	C238	C238	2182358G95	2182358G95	C239	C239	2182358G95	2182358G95
R26	R116	0.29 uH choke	2484545H01	L16	L116	Code: CLFAR, 2-1/4 turns	2484545H01	C240	C240	2182358G95	2182358G95	C241	C241	2182358G95	2182358G95	C242	C242	2182358G95	2182358G95
R27	R117	0.085 uH choke	2484545H01	L17	L117	Code: CLFAR, 4-1/4 turns	2484545H01	C243	C243	2182358G95	2182358G95	C244	C244	2182358G95	2182358G95	C245	C245	2182358G95	2182358G95
R28	R118	0.29 uH choke	2484545H01	L18	L118	Code: CLFAR, 2-1/4 turns	2484545H01	C246	C246	2182358G95	2182358G95	C247	C247	2182358G95	2182358G95	C248	C248	2182358G95	2182358G95
R29	R119	0.085 uH choke	2484545H01	L19	L119	Code: CLFAR, 4-1/4 turns	2484545H01	C249	C249	2182358G95	2182358G95	C250	C250	2182358G95	2182358G95	C251	C251	2182358G95	2182358G95
R30	R120	0.29 uH choke	2484545H01	L20	L120	Code: CLFAR, 2-1/4 turns	2484545H01	C252	C252	2182358G95	2182358G95	C253	C253	2182358G95	2182358G95	C254	C254	2182358G95	2182358G95
R31	R121	0.085 uH choke	2484545H01	L21	L121	Code: CLFAR, 4-1/4 turns	2484545H01	C255	C255	2182358G95	2182358G95	C256	C256	2182358G95	2182358G95	C257	C257	2182358G95	2182358G95
R32	R122	0.29 uH choke	2484545H01	L22	L122	Code: CLFAR, 2-1/4 turns	2484545H01	C258	C258	2182358G95	2182358G95	C259	C259	2182358G95	2182358G95	C260	C260	2182358G95	2182358G95
R33	R123	0.085 uH choke	2484545H01	L23	L123	Code: CLFAR, 4-1/4 turns	2484545H01	C261	C261	2182358G95	2182358G95	C262	C262	2182358G95	2182358G95	C263	C263	2182358G95	2182358G95
R34	R124	0.29 uH choke	2484545H01	L24	L124	Code: CLFAR, 2-1/4 turns	2484545H01	C264	C264	2182358G95	2182358G95	C265	C265	2182358G95	2182358G95	C266	C266	2182358G95	2182358G95
R35	R125	0.085 uH choke	2484545H01	L25	L125	Code: CLFAR, 4-1/4 turns	2484545H01	C267	C267	2182358G95	2182358G95	C268	C268	2182358G95	2182358G95	C269	C269	2182358G95	2182358G95
R36	R126	0.29 uH choke	2484545H01	L26	L126	Code: CLFAR, 2-1/4 turns	2484545H01	C270	C270	2182358G95	2182358G95	C271	C271	2182358G95	2182358G95	C272	C272	2182358G95	2182358G95
R37	R127	0.085 uH choke	2484545H01	L27	L127	Code: CLFAR, 4-1/4 turns	2484545H01	C273	C273	2182358G95	2182358G95	C274	C274	2182358G95	2182358G95	C275	C275	2182358G95	2182358G95
R38	R128	0.29 uH choke	2484545H01	L28	L128	Code: CLFAR, 2-1/4 turns	2484545H01	C276	C276	2182358G95	2182358G95	C277	C277	2182358G95	2182358G95	C278	C278	2182358G95	2182358G95
R39	R129	0.085 uH choke	2484545H01	L29	L129	Code: CLFAR, 4-1/4 turns	2484545H01	C279	C279	2182358G95	2182358G95	C280	C280	2182358G95	2182358G95	C281	C281	2182358G95	2182358G95
R40	R130	0.29 uH choke	2484545H01	L30	L130	Code: CLFAR, 2-1/4 turns	2484545H01	C282	C282	2182358G95	2182358G95	C283	C283	2182358G95	2182358G95	C284	C284	2182358G95	2182358G95
R41	R131	0.085 uH choke	2484545H01	L31	L131	Code: CLFAR, 4-1/4 turns	2484545H01	C285	C285	2182358G95	2182358G95	C286	C286	2182358G95	2182358G95	C287	C287	2182358G95	2182358G95
R42	R132	0.29 uH choke	2484545H01	L32	L132	Code: CLFAR, 2-1/4 turns	2484545H01	C288	C288	2182358G95	2182358G95	C289	C289	2182358G95	2182358G95	C290	C290	2182358G95	2182358G95
R43	R133	0.085 uH choke	2484545H01	L33	L133	Code: CLFAR, 4-1/4 turns	2484545H01	C291	C291	2182358G95	2182358G95	C292	C292	2182358G95	2182358G95	C293	C293	2182358G95	2182358G95
R44	R134	0.29 uH choke	2484545H01	L34	L134	Code: CLFAR, 2-1/4 turns	2484545H01	C294	C294	2182358G95	2182358G95	C295	C295	2182358G95	2182358G95	C296	C296	2182358G95	2182358G95
R45	R135	0.085 uH choke	2484545H01	L35	L135	Code: CLFAR, 4-1/4 turns	2484545H01	C297	C297	2182358G95	2182358G95	C298	C298	2182358G95	2182358G95	C299	C299	2182358G95	2182358G95
R46	R136	0.29 uH choke	2484545H01	L36	L136	Code: CLFAR, 2-1/4 turns	2484545H01	C300	C300	2182358G95	2182358G95	C301	C301	2182358G95	2182358G95	C302	C302	2182358G95	2182358G95
R47	R137	0.085 uH choke	2484545H01	L37	L137	Code: CLFAR, 4-1/4 turns	2484545H01	C303	C303	2182358G95	2182358G95	C304	C304	2182358G95	2182358G95	C305	C305	2182358G95	2182358G95
R48	R138	0.29 uH choke	2484545H01	L38	L138	Code: CLFAR, 2-1/4 turns	2484545H01	C306	C306	2182358G95	2182358G95	C307	C307	2182358G95	2182358G95	C308	C308	2182358G95	2182358G95
R49	R139	0.085 uH choke	2484545H01	L39	L139	Code: CLFAR, 4-1/4 turns	2484545H01	C309	C309	2182358G95	2182358G95	C310	C310	2182358G95	2182358G95	C311	C311	2182358G95	2182358G95
R50	R140	0.29 uH choke	2484545H01	L40	L140	Code: CLFAR, 2-1/4 turns	2484545H01	C312	C312	2182358G95	2182358G95	C313	C313	2182358G95	2182358G95	C314	C314	2182358G95	2182358G95
R51	R141	0.085 uH choke	2484545H01	L41	L141	Code: CLFAR, 4-1/4 turns	2484545H01	C315	C315	2182358G95	2182358G95	C316	C316	2182358G95	2182358G95	C317	C317	2182358G95	2182358G95
R52	R142	0.29 uH choke	2484545H01	L42	L142	Code: CLFAR, 2-1/4 turns	2484545H01	C318	C318	2182358G95	2182358G95	C319	C319	2182358G95	2182358G95	C320	C320	2182358G95	2182358G95
R53	R143	0.085 uH choke	2484545H01	L43	L143	Code: CLFAR, 4-1/4 turns	2484545H01	C321	C321	2182358G95	2182358G95	C322	C322	2182358G95	2182358G95	C323	C323	2182358G95	2182358G95
R54	R144	0.29 uH choke	2484545H01	L44	L144	Code: CLFAR, 2-1/4 turns	2484545H01	C324	C324	2182358G95	2182358G95	C325	C325	2182358G95	2182358G95	C326	C326	2182358G95	2182358G95
R55	R145	0.085 uH choke	2484545H01	L45	L145	Code: CLFAR, 4-1/4 turns	2484545H01	C327	C327	2182358G95	2182358G95	C328	C328	2182358G95	2182358G95	C329	C329	2182358G95	2182358G95
R56	R146	0.29 uH choke	2484545H01	L46	L146	Code: CLFAR, 2-1/4 turns	2484545H01	C330	C330	2182358G95	2182358G95	C331	C331	2182358G95	2182358G95	C332	C332	2182358G95	2182358G95
R57	R147	0.085 uH choke	2484545H01	L47	L147	Code: CLFAR, 4-1/4 turns	2484545H01	C333	C333	2182358G95	2182358G95	C334	C334	2182358G95	2182358G95	C335	C335	2182358G95	2182358G95
R58	R148	0.29 uH choke	2484545H01	L48	L148	Code: CLFAR, 2-1/4 turns	2484545H01	C336	C336	2182358G95	2182358G95	C337	C337	2182358G95	2182358G95	C338	C338	2182358G95	2182358G95
R59	R149	0.085 uH choke	2484545H01	L49	L149	Code: CLFAR, 4-1/4 turns	2484545H01	C339	C339	2182358G95	2182358G95	C340	C340	2182358G95	2182358G95	C341	C341	2182358G95	2182358G95
R60	R150	0.29 uH choke	2484545H01	L50	L150	Code: CLFAR, 2-1/4 turns	2484545H01	C342	C342	2182358G95	2182358G95	C343	C343	2182358G95	2182358G95	C344	C344	2182358G95	2182358G95
R61	R151	0.085 uH choke	2484545H01	L51	L151	Code: CLFAR, 4-1/4 turns	2484545H01	C345	C345	2182358G95	2182358G95	C346	C346	2182358G95	2182358G95	C347	C347	2182358G95	2182358G95
R62	R152	0.29 uH choke	2484545H01	L52	L152	Code: CLFAR, 2-1/4 turns	2484545H01	C348	C348	2182358G95	2182358G95	C349	C349	2182358G95	2182358G95	C350	C350	2182358G95	2182358G95
R63	R153	0.085 uH choke	2484545H01	L53															

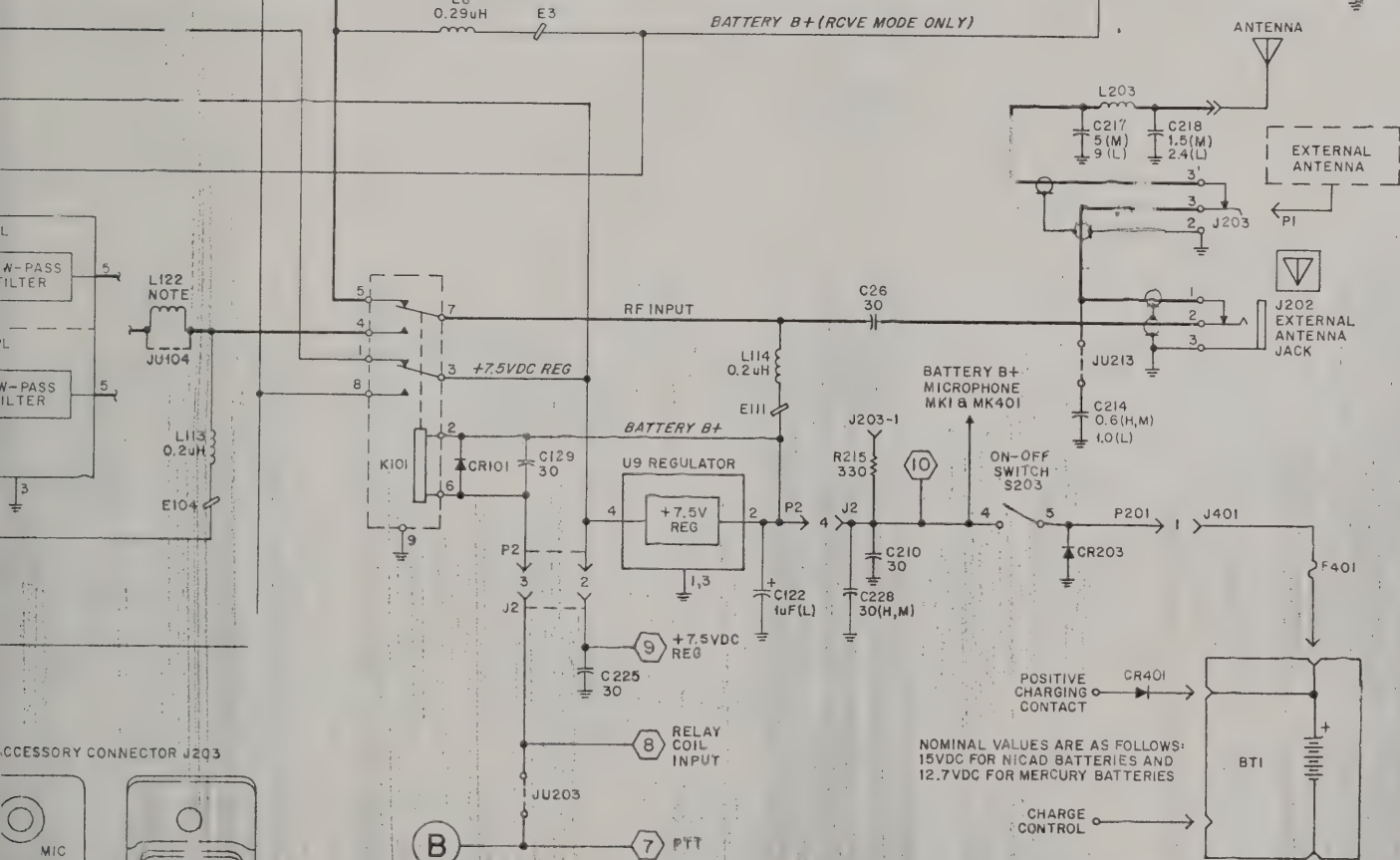
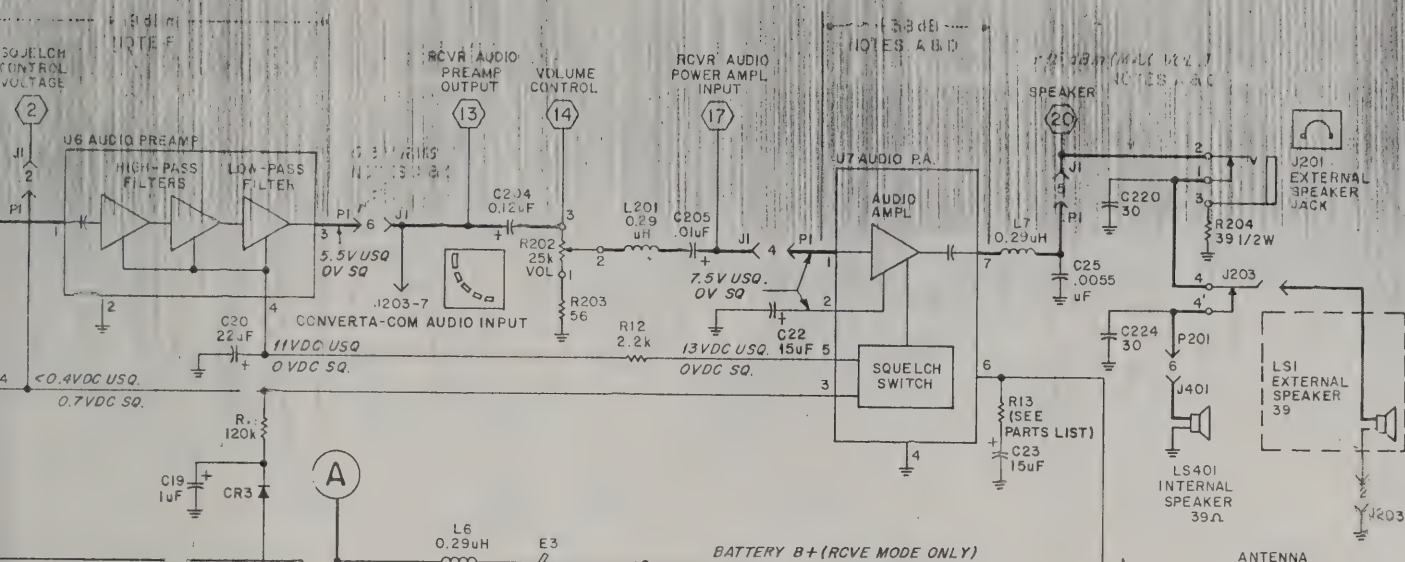




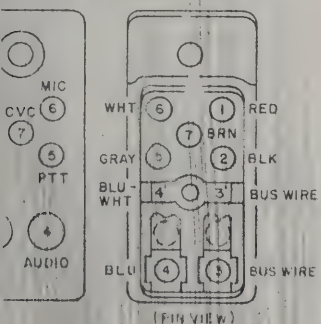






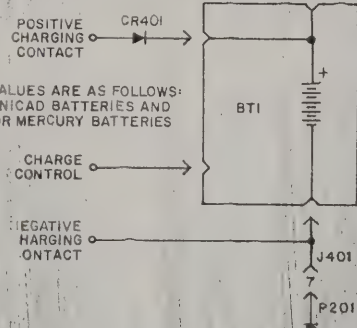


ACCESSORY CONNECTOR J203



MODEL	SUFFIX	RECEIVER FREQUENCY	TRANSMITTER FREQUENCY
NUE6231A	-	403-430 MHz	403-430 MHz
NUE6232A	2	450-482 MHz	450-482 MHz
NUE6233A	-	482-512 MHz	482-512 MHz
NUE6272A	2	440-470 MHz	440-470 MHz
NUE6281A	-	403-430 MHz	403-430 MHz
NUE6282A	2	450-482 MHz	450-482 MHz
NUE6283A	1	482-512 MHz	482-512 MHz
NUE6302A	-	440-470 MHz	440-470 MHz
NUE6312A	2	450-482 MHz	450-482 MHz
NUE6313A	1	482-512 MHz	482-512 MHz

NOMINAL VALUES ARE AS FOLLOWS:  
15VDC FOR NICAD BATTERIES AND  
12.7VDC FOR MERCURY BATTERIES



63E81010C82-C











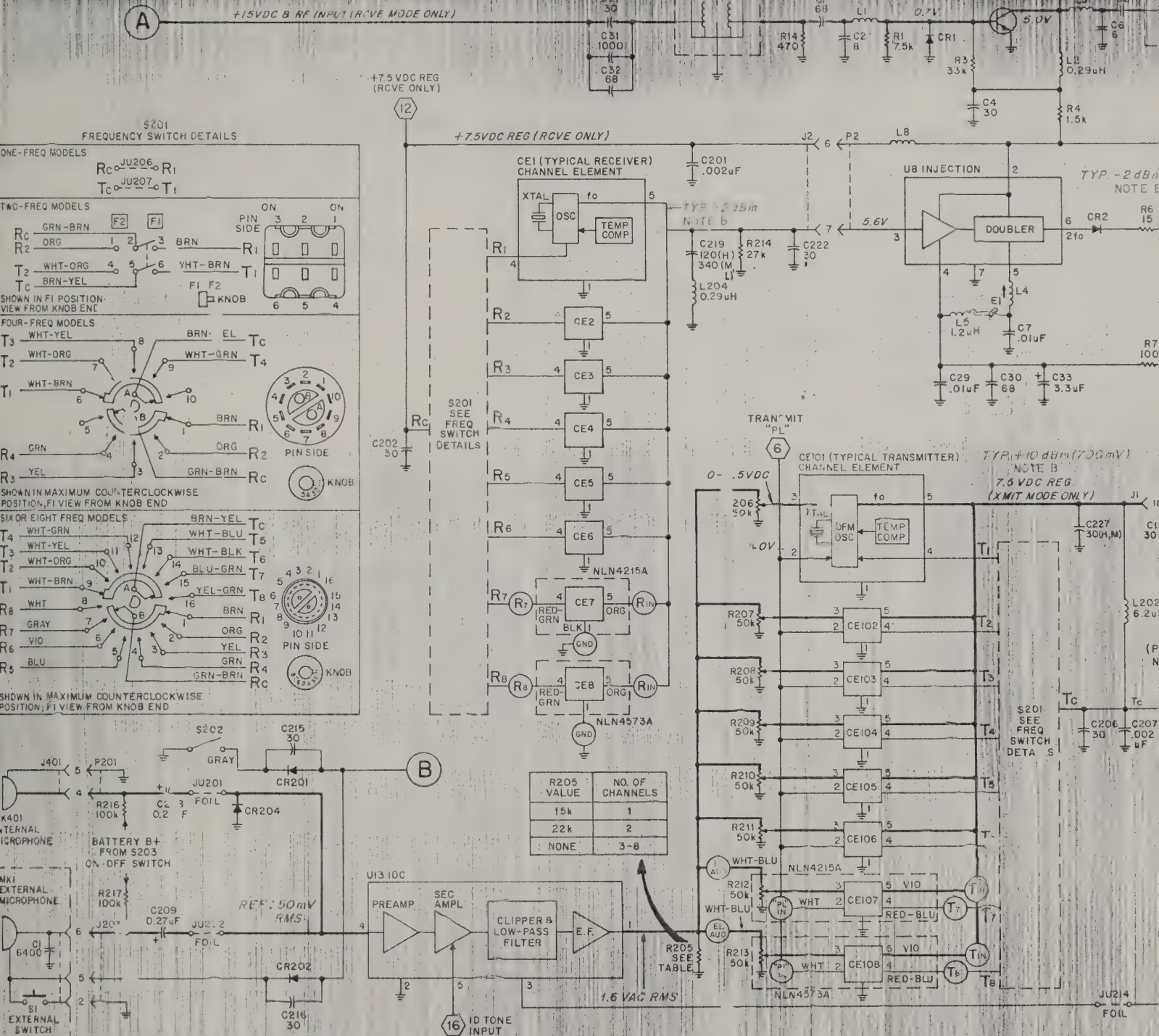






NOTES:

- 1000V CARRIER SIGNAL WITH 10KHz TONE AT 50% MODULATION.
- MEASUREMENT MADE WITH MOTOROLA MODEL 500 ANALOG RF MILLIVOLTMETER WITH HIGH IMPEDANCE PROB.
- MEASUREMENT MADE WITH MOTOROLA MODEL 1-105 AC VOLTMETER.
- USE VOLUME CONTROL TO SIM -40 DBA REFERRED AT 1KHz.
- MEASUREMENT MADE WITH NO CARRIER SIGNAL, DATA IS REJECTED.
- STAGE GAINS ARE FOR REFERENCE ONLY, SEE THE FREQUENCY SWITCH SECTION OF THE INSTRUCTION MANUAL FOR BASIC FREQUENCY MEASUREMENT PROCEDURES.





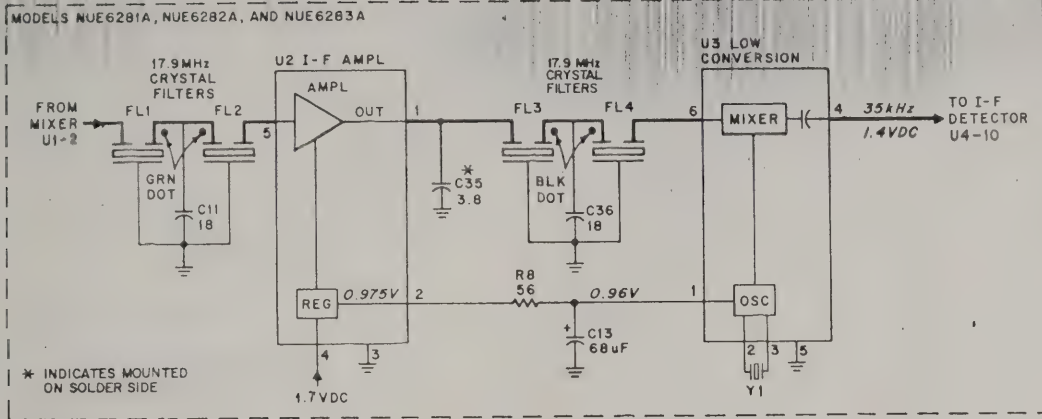


# NUE6281A, NUE6282A AND NUE6283A

NOTES

- A. 1000V CARRIER SIGNAL WITH 100V
- B. MEASUREMENT MADE WITH MOTOR
- C. MEASUREMENT MADE WITH MOTOR
- D. USE VOLUME CONTROL TO SET
- E. MEASUREMENT MADE WITH NO CARRIER
- F. STATE GAINS ARE FOR REFERENCE
- G. OF THE INSTRUCTION MANUAL

A



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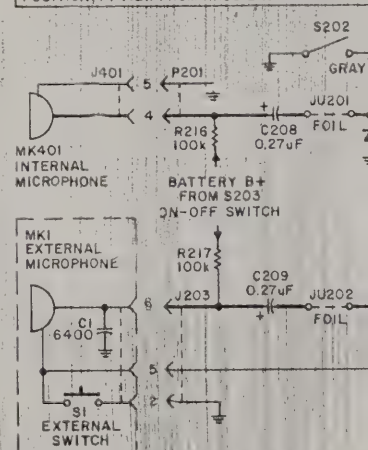
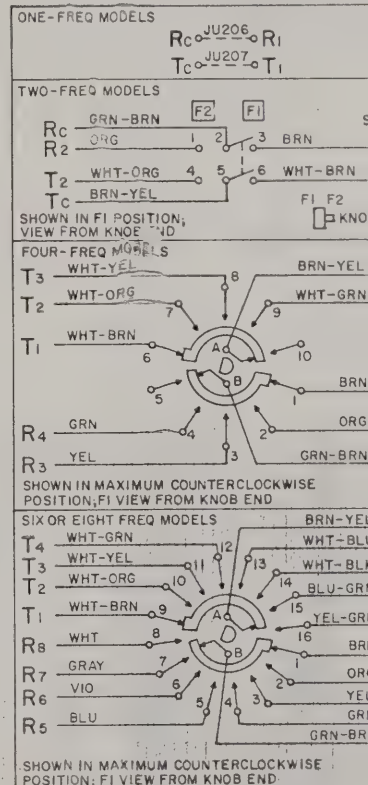
SECOND OSCILLATOR CRYSTAL FREQUENCIES

CARRIER FREQUENCY $f_c$	FIRST OSCILLATOR CRYSTAL FREQUENCY $f_{01}$	SECOND OSCILLATOR CRYSTAL FREQUENCY $f_{02}$
450.0 - 460.8	54.0125 - 55.3625	17.865
460.8 - 461.0	55.3625 - 55.3875	17.935
461.0 - 462.4	55.3875 - 55.5625	17.865
462.4 - 462.6	55.5625 - 55.5875	17.935
462.6 - 464.4	55.5875 - 55.8125	17.865
464.4 - 464.6	55.8125 - 55.8375	17.935
464.6 - 467.0	55.8375 - 56.1375	17.865
467.0 - 467.2	56.1375 - 56.1625	17.935
467.2 - 470.4	56.1625 - 56.5625	17.865
470.4 - 470.6	56.5625 - 56.5875	17.935
470.6 - 475.1	56.5875 - 57.1500	17.865
475.1 - 475.4	57.1500 - 57.1875	17.935
475.4 - 478.3	57.1875 - 57.5500	17.865
478.3 - 478.5	57.5500 - 57.5750	17.935
478.5 - 482.3	57.5750 - 58.0500	17.865
482.3 - 482.5	58.0500 - 58.0750	17.935
482.5 - 487.4	58.0750 - 58.6875	17.865
487.4 - 487.6	58.6875 - 58.7125	17.935
487.6 - 489.5	58.7125 - 58.9500	17.865
489.5 - 490.0	58.9500 - 59.0125	17.935
490.0 - 494.2	59.0125 - 59.5375	17.865
494.2 - 494.4	59.5375 - 59.5625	17.935
494.4 - 500.2	59.5625 - 60.2875	17.865
500.2 - 500.3	60.2875 - 60.3000	17.935
500.3 - 503.7	60.3000 - 60.7250	17.865
503.7 - 503.9	60.7250 - 60.7500	17.935
503.9 - 506.1	60.7500 - 61.0250	17.865
506.1 - 506.3	61.0250 - 61.0500	17.935
506.3 - 507.8	61.0500 - 61.2375	17.865
507.8 - 508.0	61.2375 - 61.2625	17.935
508.0 - 510.1	61.2625 - 61.5250	17.865
510.1 - 510.3	61.5250 - 61.5500	17.935
510.3 - 512.0	61.5500 - 61.7625	17.865

CRYSTAL FORMULA:  $f_c = 8f_{01} + 17.9 \text{ MHz}$

EPF-8201-0

S201  
FREQUENCY SWITCH DETAILS







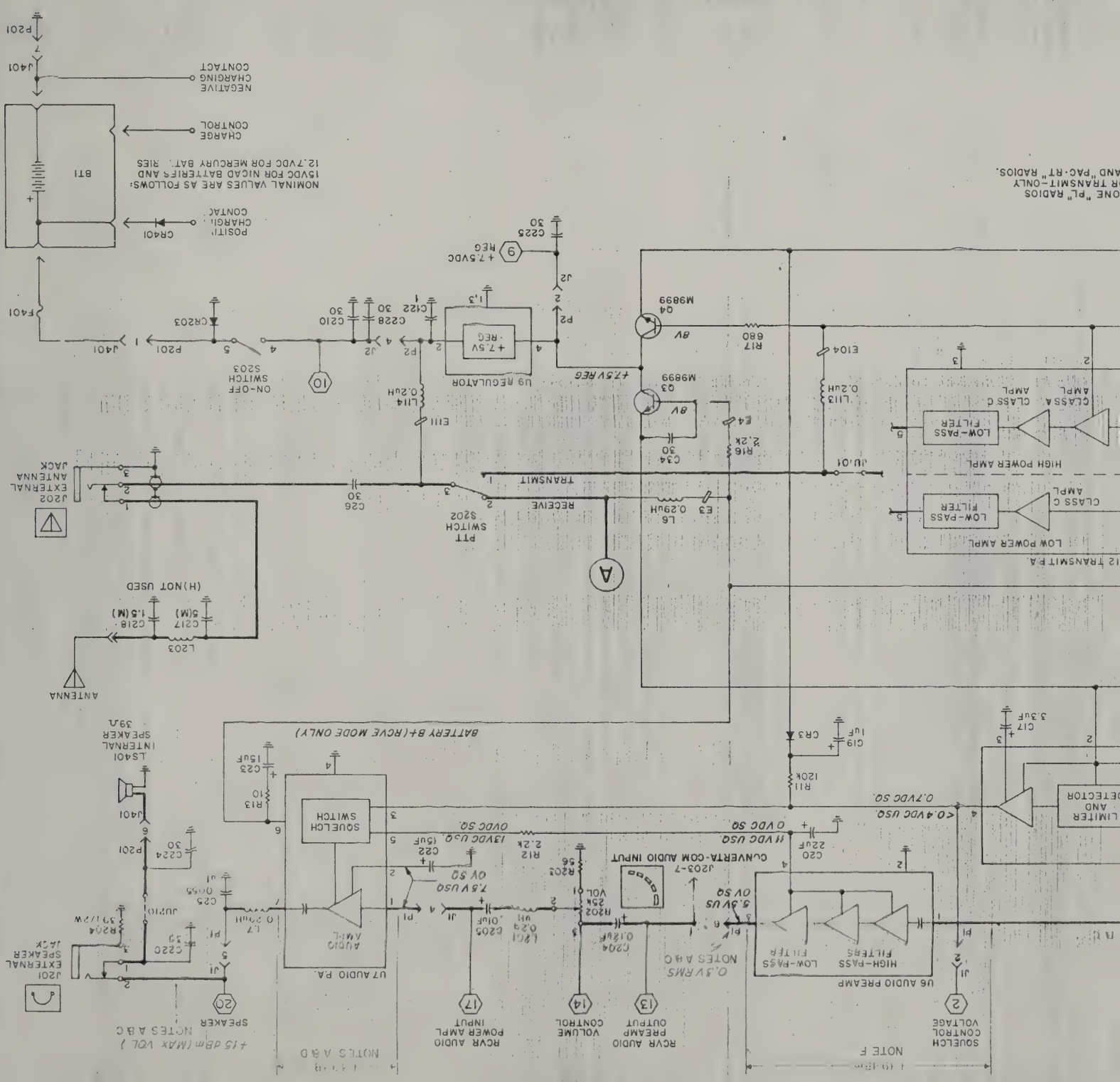
# "BBB" SERIES SCHEMATIC DIAGRAM

EPP-7878-B

OTHERWISE STATED, RESISTANCES ARE IN OHMS AND CAPACITANCES IN PICOFARADS.  
 LARGES ARE MEASURED FROM POINT INDICATED TO CHASSIS GROUND.  
 MOTOROLA DC MULTIMETER OR EQUIVALENT.  
 INDICATES CONNECTION POINT TO INTERCONNECT CIRCUIT BOARD.  
 SERIES DESIGNATIONS ARE ASSIGNED IN THE FOLLOWING MANNER:  
 IT SERIES = RECEIVER  
 SERIES = TRANSMITTER  
 SERIES = INTERCONNECT BOARD  
 SERIES = FRONT COVER  
 AND C101 USED ONLY ON MODELS WITH ISSUE O AND A, U10'S.

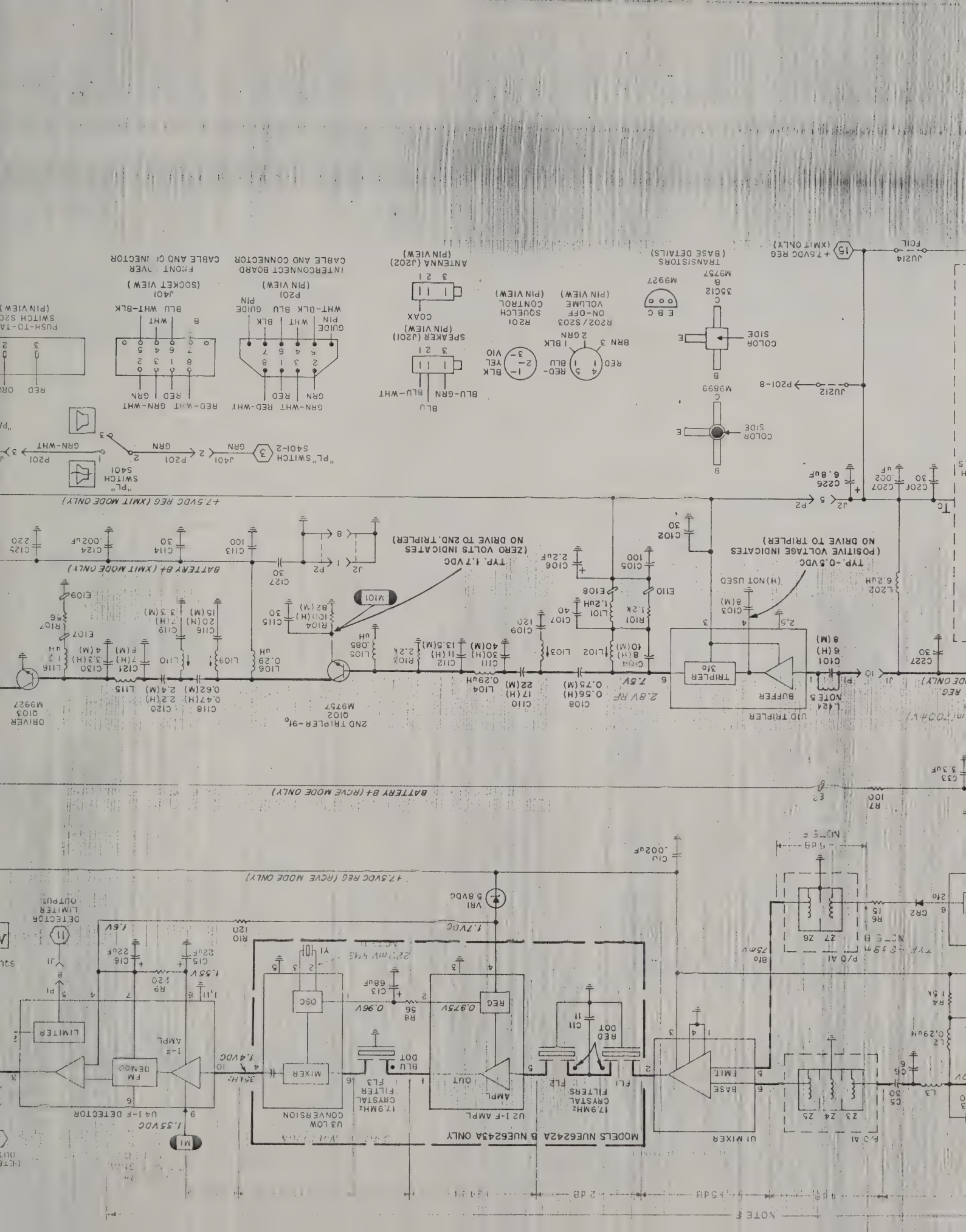
## SCHEMATIC NOTES

MODEL	SUFFIX	FREQUENCY
NUE6293A	1	482 - 512 MHz
NUE6292A	2	450 - 482 MHz
NUE6293A	1	482 - 512 MHz
NUE6292A	2	450 - 482 MHz



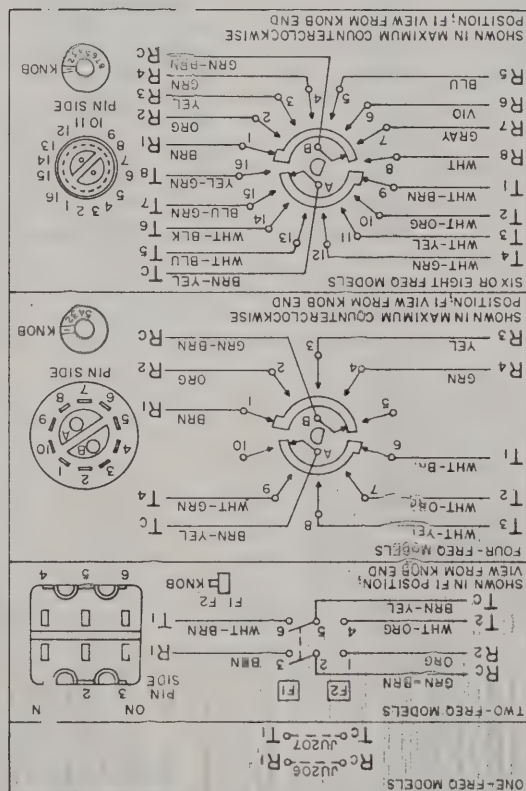










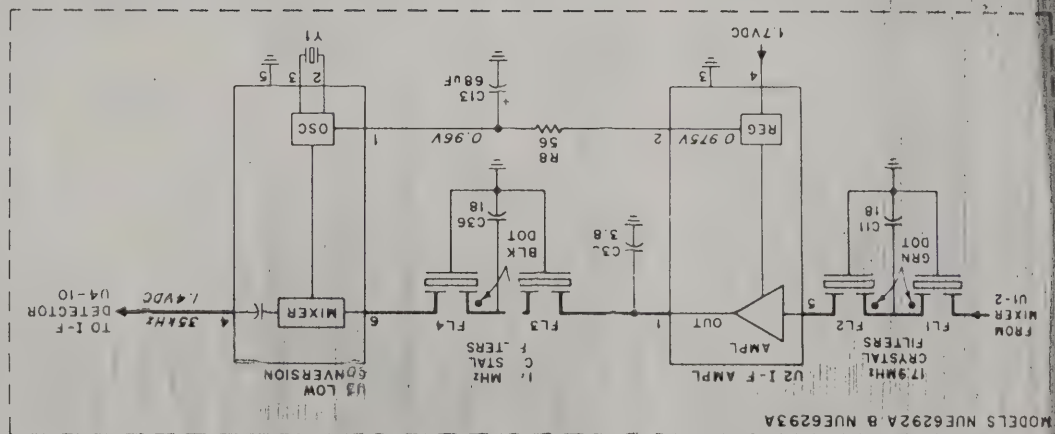






# NUE6292A AND NUE6293A

1. LOCATE CARRIER SIGNAL WITH  
B. MEASUREMENT MADE WITH WOT  
C. MEASUREMENT MADE WITH NO  
D. USE VOLUME CONTROL TO SET  
E. MEASUREMENT MADE WITH NO  
F. STAGE GAINS ARE FOR REFEREN  
G. OF THE INSTRUCTION MANUAL



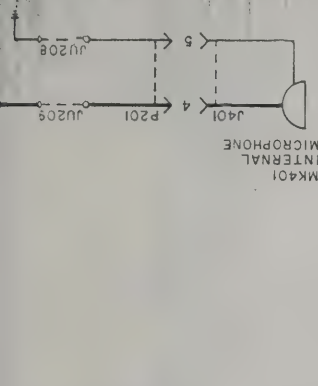
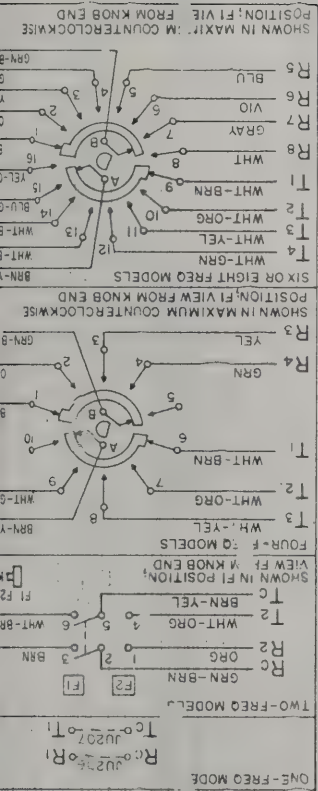
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## SECOND OSCILLATOR CRYSTAL FREQUENCIES

CARRIER FREQUENCY	FIRST OSCILLATOR CRYSTAL FREQUENCY	SECOND OSCILLATOR CRYSTAL FREQUENCY
450.0 - 460.8	54.0125 - 55.3625	17.865
460.8 - 461.0	55.3825 - 55.3875	17.935
461.0 - 462.4	55.3875 - 55.5625	17.865
462.4 - 462.6	55.5625 - 55.5875	17.935
462.6 - 464.4	55.5875 - 55.8125	17.865
464.4 - 464.6	55.8125 - 55.8375	17.935
464.6 - 467.0	55.8375 - 56.1375	17.865
467.0 - 467.2	56.1375 - 56.1625	17.935
467.2 - 470.4	56.1625 - 56.5625	17.865
470.4 - 470.6	56.5625 - 56.5875	17.935
470.6 - 475.1	56.5875 - 57.1500	17.865
475.1 - 475.4	57.1500 - 57.1875	17.935
475.4 - 478.3	57.1875 - 57.5500	17.865
478.3 - 478.5	57.5500 - 57.5750	17.935
478.5 - 478.8	57.5750 - 58.0500	17.865
478.8 - 482.3	58.0500 - 58.0750	17.935
482.3 - 482.5	58.0750 - 58.6875	17.865
482.5 - 487.4	58.6875 - 58.7125	17.935
487.4 - 487.6	58.7125 - 58.9500	17.865
487.6 - 489.5	58.9500 - 59.0125	17.935
489.5 - 490.0	59.0125 - 59.5375	17.865
490.0 - 494.2	59.5375 - 59.5625	17.935
494.2 - 494.4	59.5625 - 60.2875	17.865
494.4 - 500.2	60.2875 - 60.3000	17.935
500.2 - 500.3	60.3000 - 60.7250	17.865
500.3 - 503.7	60.7250 - 60.7500	17.935
503.7 - 503.9	60.7500 - 61.0250	17.865
503.9 - 504.1	61.0250 - 61.0500	17.935
504.1 - 506.3	61.0500 - 61.2375	17.865
506.3 - 507.8	61.2375 - 61.2625	17.935
507.8 - 508.0	61.2625 - 61.5250	17.865
508.0 - 509.1	61.5250 - 61.5500	17.935
509.1 - 510.3	61.5500 - 61.5500	17.865
510.3 - 512.0	61.5500 - 61.5500	17.935

CRYSTAL FORMULA:  $f_c = 8101 + 17.9 \text{ MHz}$

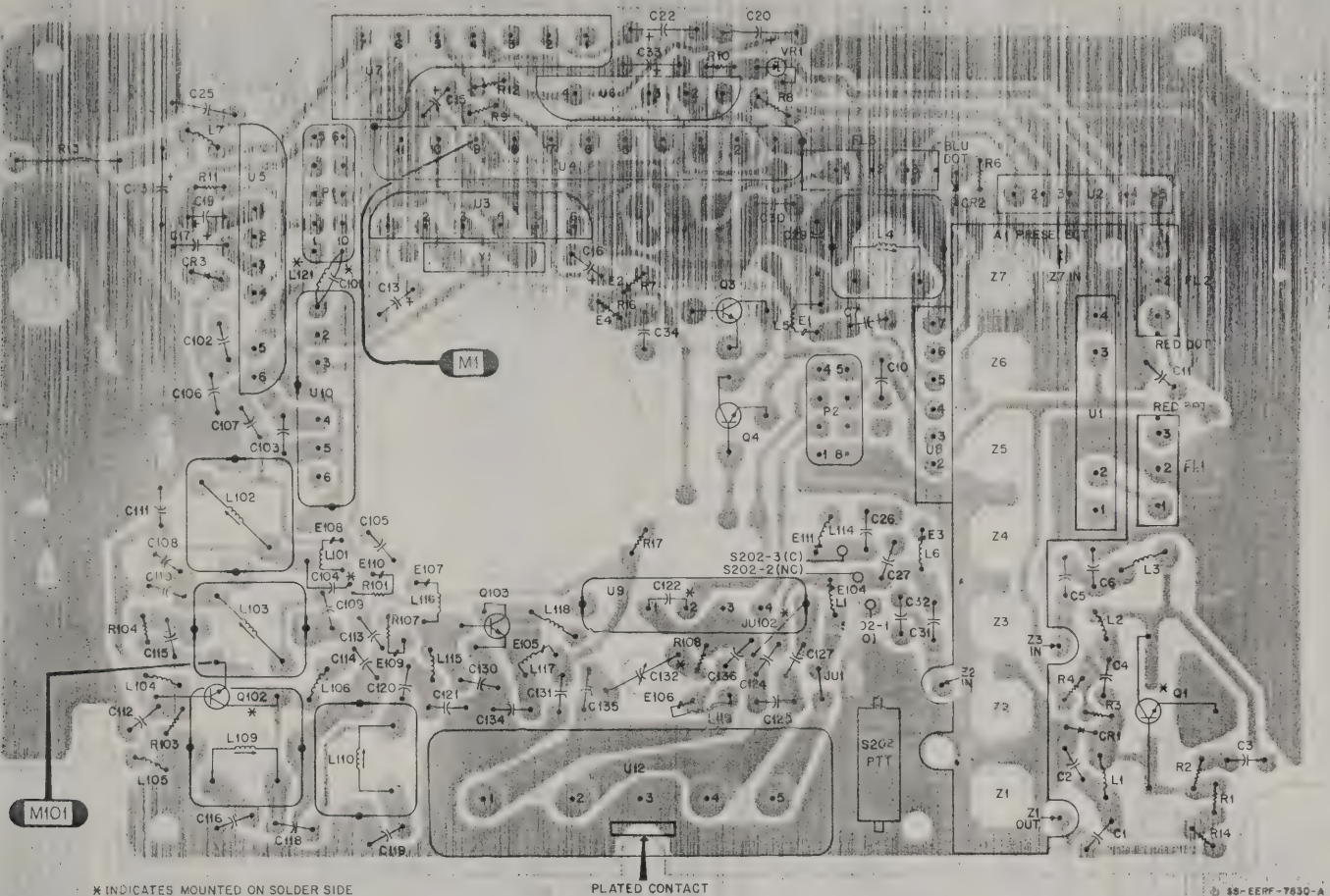
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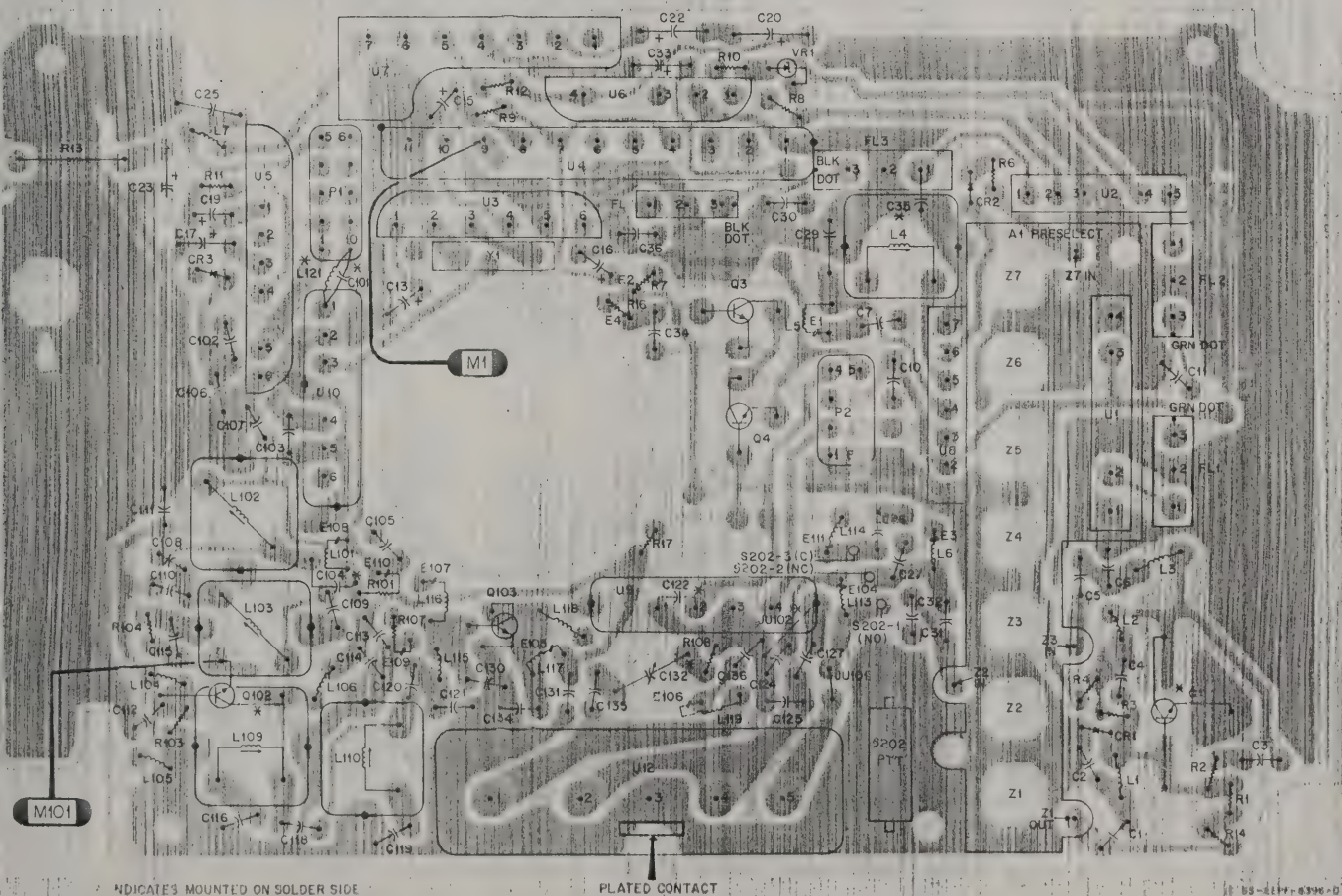




# NUE6242A & NUE6243A (Viewed from Solder Side)



# NUE6292A & NUE6293A (Viewed from Solder Side)













REFERENCE	SYMBOL	MOTOROLA	PART NO.	DESCRIPTION
A1		510 177D55		PRESELECTOR
		510 77D56		482-512 MHz
				75 V unless stated
				CAPACITOR, fixed: pf $\pm 10\%$
C1		2182358C23		68 $\pm 5\%$ , 100V, N4700
C2		2100861429		8; N150
C3, 4, 5		2182358C95		30; N750
C6		2100861428		6; N150
C7		2184008H16		.01 pf $\pm 5\%$ , 50 V, Y5F
C10		2182213E21		.002 pf
C11		2182877B52		11 $\pm 5\%$ , 50 V, N150 (NU6642A)
				18 $\pm 5\%$ , 50 V, N150 (NU66292A)
				8; N150 (M only)
				8; N150 (M)
C13		2305612E02		68 pf $\pm 20\%$ , 2 V
				22 pf $\pm 20\%$ , 2 V
C17		2382397D28		3.3 pf $\pm 20\%$ , 20 V
C19		2382397D36		1 pf, 20 V
C20		2382397D16		22 pf $\pm 20\%$ , 15 V
C22		2382397D04		15 pf $\pm 20\%$ , 15 V
C23		2382397D17		15 pf $\pm 20\%$ , 20 V
C25		2182213E03		.0055 pf $\pm 0+100\%$ , 75 V
C26, 27		2182358C95		30; N750
C29		2184008H16		.01 pf $\pm 5\%$ , 50 V, Y5F
C30		2182358C23		68 $\pm 5\%$ , 100 V, N4700
C31		2182213E08		1000 $\pm 5\%$ , 100 V, Y5D
C32		2182358C23		68 $\pm 5\%$ , 100 V, N4700
C33		2382397D28		3.3 pf $\pm 20\%$ , 20 V
C34		2182358C95		30; N750
C35		2182877B09		3.8 $\pm 0.25$ pf; NPO (NU66292A)
C36		2182358C66		18 $\pm 5\%$ , 50 V, N150 (NU66292A)
				8; N150 (M)
C101		2100861429		8; N150 (M)
C102		2100861428		6; N150 (H)
				30; N750
C103		2100861429		8; N150 (M only)
C104		210311E104		10 $\pm 5\%$ , 100 V, N150 (M)
				8; N150 (H)
C105		2184008H16		100 $\pm 20\%$ , 100 V
C106		2382397D19		2.2 pf $\pm 20+40\%$ , 10 V
C107		2105311E11		40; 100 V, N150
C108		2182450B22		0.75; 500 V (M)
C109		2182450B40		0.56; 500 V (H)
				120; 100 V, N150
C110		2105311E29		22 $\pm 5\%$ , 25 V (M)
				21 $\pm 5\%$ , 25 V (H)
C111		2105311E11		40 $\pm 10\%$ , 50 V (M)
				30; N750 (H)
C112		2182358C95		13.5; N150 (M)
				11; N150 (H)
C113		2182213E29		100 $\pm 20\%$ , 100 V
C114, 115		2182358C95		30; N750
C116		2100861462		15; N150 (M)
				20; N150 (H)
C118		2182450B41		0.62; 500 V (M)
				0.47; 500 V (H)
C119		2100861603		3.3 $\pm 0.25$ pf; NPO (M)
				7.5%; 25 V, N150 (H)
C120		2105311E18		2.4 $\pm 0.1$ pf; 100 V, NPO (M)
				2.2 $\pm 0.25$ pf; N150 (H)
C121		2100861429		8; N150 (M)
				7.5%; 25 V, N150 (H)
C122		2382397D36		1 pf, 20 V
C124		2182213E21		.002 pf $\pm 20+100\%$ ; K6000
C125		2182213E30		220; 100 V
C127		2182358C95		30; N750
C130		2100861427		4; N150 (M)
C131		2100861603		3.3 $\pm 0.25$ pf; NPO (H)
				30; N750
C132		2005272C03		trimmer, 2-10; 100 V
C134		2182358C84		1.7 $\pm 0.1$ pf; 50 V, N150 (M)
C135		2100861429		8; N150 (H)
C136		2184008H16		.01 pf, 50 V, Y5F
				3.3 $\pm 0.25$ pf; NPO (M)
				2.4 $\pm 0.1$ pf; 100 V, NPO (H)
C201		2182358C95		.002 pf $\pm 20+100\%$ ; K6000
C202		2184008H14		100 pf $\pm 10\%$ , 100

[illegible]





# TRANSMITTER ALIGNMENT

- Preliminary Adjustments:
1. Connect a 50-ohm load to external antenna jack J202.
  2. Set frequency switch S201 to the lowest frequency channel.
  3. Preposition slugs of L102, L103, L109, and L110 one-eighth inch above circuit board solder side.
  4. Preposition "Instantaneous Deviation Control" (IDC) controls R206 through R213 to midrange.
  5. Adjust Service Monitor to channel selected.
  6. Make all measurements with radio "keyed."

STEP	TEST EQUIPMENT USED		MEASUREMENT
	ADJUST	TYPE	

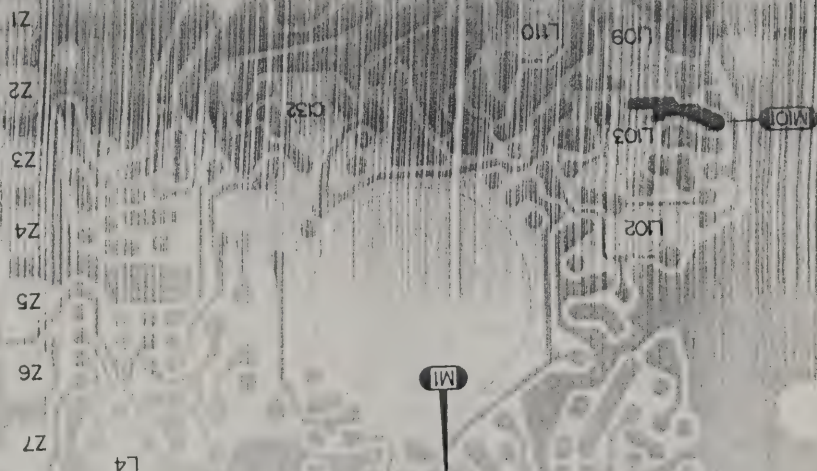
1	L103, L102	DC Voltmeter	M101	Preliminary	Adjustment	Time for maximum dc voltage (typically 1.7 Vdc).
2	L110	Ammeter	Power Supply	Preliminary	Adjustment	Tune for maximum radio current.
3	C132	Ammeter	Power Supply	Preliminary	Adjustment	Tune for maximum radio current.
4	L109 and repeak L110	Ammeter	Power Supply	Preliminary	Adjustment	Time for maximum radio current.
5	C132	Ammeter	Power Supply	Readjust C132 only if after step 4 current is above rated specifications.	Adjustment	For 1-watt models, if power output is greater than 1 watt, readjust C132 for 1 watt.
				No change	Adjust for zero error (transmitter frequency)	

7	"Private-Line" Deviation Control (Tone PL, R504; Digital PL - R604), if applicable.	Service Monitor	Antenna Jack J202 through a 30 dB attenuating pad and Tuneup Cable NKN6248	On PL models, Tone or Digital PL deviation should be $\pm 500$ to $\pm 1000$ Hz ( $\pm 750$ Hz for minial).	---	
8	Repeat steps 6 and 7 for each channel in the radio; be sure to set the frequency switch to the channel being aligned (CE101/F1, CE102/F2, CE103/F3, CE104/F4, CE105/F5, CE106/F6, CE107/F7, and CE108/F8).	Service Monitor	Antenna Jack J202 through a 30 dB attenuating pad and Tuneup Cable NKN6248	Addio input signal of 50 mV rms (1000 Hz) at IDC Module U13, pin 4	---	
9	F1 IDC Control R206	Service Monitor	Antenna Jack J202 through a 30 dB attenuating pad and Tuneup Cable NKN6248	Check for rated power and rated current on all channels.	---	
10	Repeat step 9 for each channel (R207/F2, R208/F3, R209/F4, R210/F5, R211/F6, R212/F7, and R213/F8).	RF Wattmeter	Antenna Jack J202 through a 30 dB attenuating pad and Tuneup Cable NKN6248			

NOTES: CHANNEL ELEMENT (CE101, CE102, ETC.) FREQUENCY  
 $f_c$  = carrier frequency,  $f_o$  = oscillator frequency,  $f_c = 9f_o$

11	---	RF Wattmeter	Antenna Jack J202 through a 30 dB attenuating pad and Tuneup Cable NKN6248	Check for rated power and rated current on all channels.	---	
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Typical Transmitter-Receiver Alignment Points



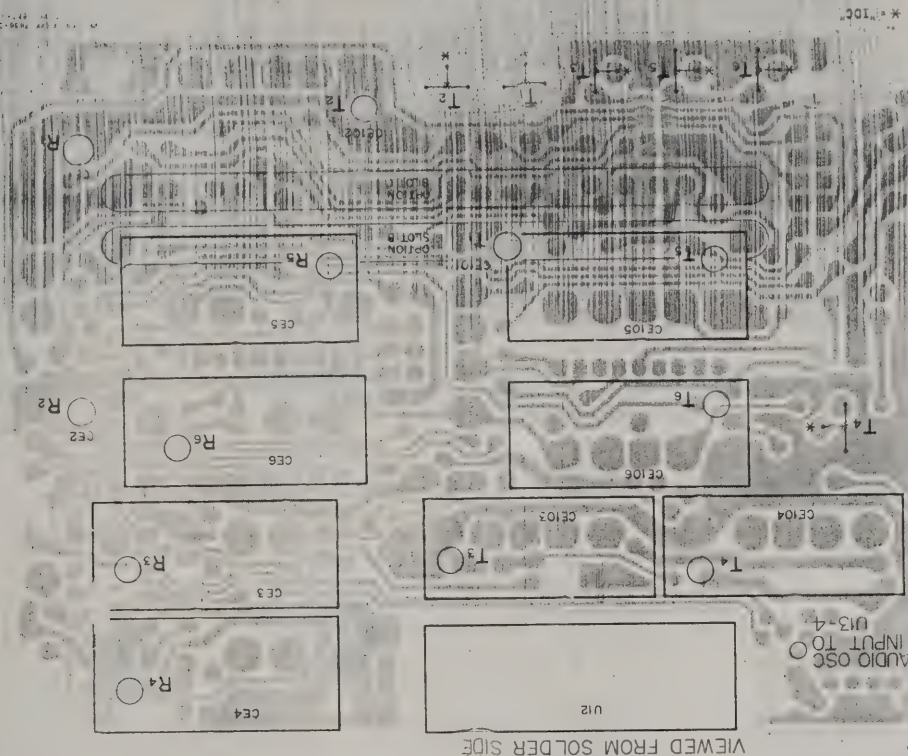
ALIGNMENT  
 PROCEDURE

EPP-7851-B





# Interconnect Board Alignment Points



VIEWED FROM SOLDER SIDE

NOTE: CHANNEL ELEMENT (CE1, CE2, ETC.) FREQUENCY  
 $f_c$  = carrier frequency,  $f_g$  = oscillator frequency,  $f_o$  = 8f<sub>o</sub> + 17.9 MHz

EPE-7850-O

STEP	ADJUST	FOR	MEASURED	USING	NOTE
3	Volume Control R202	2.2 volts ac	Speaker Jack J201	AC Voltmeter, Tuneup Cable NKN6248	Establish reference noise level. Also make sure the 17.9 MHz oscillator is turned off.
4	Service Monitor for Frequency & Output Adjustment Controls	Carrier frequency & maximum output	Antenna Jack J202	Service Monitor, Tuneup Cable NKN6248	
5	When using the preferred method to align the channel elements, repeat step 4 first and then step 2 for each channel element in the radio. When using an alternate method, repeat the step (2A or 2B) for each channel element in the radio. Be sure to set the frequency switch to the channel being aligned (CE1/F1, CE2/F2, CE3/F3, CE4/F4, CE5/F5, CE6/F6, CE7/F7, and CE8/F8).				
6	L4, Z7, Z6, Z1, Z2, Z3, Z4, Z5	Best quieting (lowest ac voltage) with frequency switch S201 set to channel used in step 1.	Antenna Jack J202	Service Monitor, AC Voltmeter, Tuneup Cable NKN6248	Inject carrier frequency at antenna jack to produce 20 dB quieting. Adjust L4, Z7, Z6, Z1, Z2, Z3, Z4, Z5, by reducing the injected signal.
20 dB QUIETING TEST (Perform on each channel)					
1	Volume Control R202	2.2 volts ac	Speaker Jack J201	AC Voltmeter, Tuneup Cable NKN6248	Establishes reference noise level.
2	Service Monitor for Frequency & Output Adjustment Controls	Carrier frequency & maximum output	Antenna Jack J202	Service Monitor, Tuneup Cable NKN6248	Reduce service monitor output level to zero after setting frequency.
3	Service Monitor Output Level	Slowly increase until noise decreases 20 dB	Speaker Jack J201	AC Voltmeter, Tuneup Cable NKN6248	Signal level must be less than 0.5 uV for 20 dB quieting.





## GENERAL

This radio has been factory aligned and does not require any adjustments. Realignment may be required if components are replaced or have aged. If it is necessary to realign the radio, perform the following procedures:

1. Remove the battery and disassemble the radio as shown in the "Disassembly Procedure". Do not disconnect the front cover receptacle from the interconnect board plug.
2. Connect a dc power supply to the front cover battery contacts; power supply negative to radio negative charging contact and power supply positive to radio positive charging contact (see "Disassembly Procedure").
3. Adjust the power supply output for 15 volts dc.
4. Perform either the "Receiver Alignment" procedure or "Transmitter Alignment" procedure or both procedures as required.

## RECEIVER ALIGNMENT

- Preliminary Adjustments:
1. Set PL switch S401 to its off (□) position (if applicable).
  2. Set squelch (⚡) control R201 to its maximum counterclockwise position.
  3. Set frequency switch S201 to the lowest frequency channel.
  4. Preposition slug of selector cavity Z1, Z2, Z3, Z4, Z5, Z6, and Z7 one-quarter inch above circuit board solder side.
  5. Preposition slug of L4 one turn out of the circuit board solder side.
  6. Connect an ac voltmeter to metering point M1 and a frequency counter to the output of the ac voltmeter.
  7. Inject a signal from a 17.9 MHz  $\pm 100$  Hz crystal oscillator into FL1 to produce at least a -30 dBm output at M1; then adjust meter to pin the needle by turning output knob down two levels. This is necessary in order to drive the frequency counter.
  8. Count the low i-f frequency through the ac voltmeter and frequency counter at M1. Record the reading within  $\pm 10$  Hz; this reference must read 35 kHz  $\pm 1.5$  kHz. Then turn off the 17.9 MHz oscillator.

STEP	ADJUST	FOR	MEASURED AT	USING	NOTE
1	Service Monitor: Frequency & Output Level Adjustment dials, & adjust L4, Z1 through Z5	Exact frequency marked on channel element and -30 dBm	M1	Service Monitor or Signal Generator, AC Voltmeter, Frequency Counter	Adjust signal generator for maximum output; if output at M1 is not -30 dBm, adjust L4, Z1, Z2, Z3, Z4, and Z5 until it is, then adjust meter to pin the needle by turning output knob down two levels. This is necessary in order to drive the frequency counter.
2	Lowest Frequency Channel Element Warp Coil	Recorded frequency in preliminary adjustment step (8) $\pm 250$ Hz	M1	Frequency Counter	---
2A	Lowest Frequency Channel Element Warp Coil	Exact channel element frequency $\pm 100$ Hz	M1	AC Voltmeter, 17.9 MHz Oscillator, Signal Generator, Oscilloscope	Warp the unit to carrier frequency as follows: a. Set power supply to 15 V dc. b. Reduce signal generator output to minimum and inject signal from a 17.9 MHz $\pm 100$ Hz crystal oscillator at FL1 and adjust output level for a -30 dBm M1 reading. c. Connect the output of the ac voltmeter to the oscilloscope and set the time base to 5 ms per division and gain to display signal amplitude of approximately 3 divisions. d. Set the signal generator to the exact carrier frequency and increase the output until the waveform on the oscilloscope appears as an amplitude modulated signal. This signal is the resultant of 17.9 MHz crystal oscillator mixing with the first i-f signal which will not be exactly 17.9 MHz until the channel element is warped to the precise frequency by adjusting the channel element warp coil. e. Adjust warp coil while viewing the signal on the oscilloscope for a zero beat or the lowest possible amplitude modulating frequency. This method will provide an accuracy of $\pm 100$ Hz adjustment of the channel element.
2B	Lowest Frequency Channel Element Warp Coil	Exact channel element frequency	M1	AC Voltmeter, 17.9 MHz Oscillator, Signal Generator	Warp the unit to carrier frequency as follows: a. Set power supply to 15 V dc. b. Reduce signal generator output to minimum and inject a signal from the 17.9 MHz crystal oscillator at FL1 and adjust output level for a -30 dBm M1 reading. c. Adjust volume control to listen to the audio output. d. Set the signal generator to the exact carrier frequency and increase the output until an audio tone is heard. This tone is the product of the mixing signals described in step 2A, Note d. e. Adjust channel element CE1 for a zero beat (no audio tone is heard when properly adjusted).

(Cont'd)





# CIRCUIT BOARD DETAIL

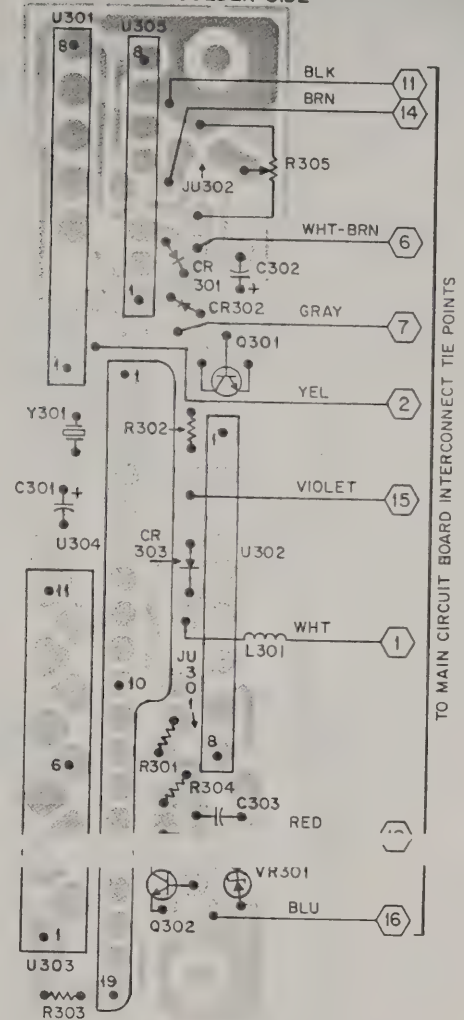
NLN7407A "Digital Private-Line" Deck

PLF-1880-A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C301, 302 C303	2305499G16 .2105457G09	<b>CAPACITOR, Fixed:</b> 10 $\mu$ F $\pm$ 20%; 16 V 1000 pF $\pm$ 10%; 63 V
CR301, 302, 303	4883654H01	<b>DIODE:</b> See Note Silicon
L301	2482723H04	<b>COIL:</b> 0.29 $\mu$ H Choke
Q301 Q302	4800869642 4805452G03	<b>TRANSISTOR:</b> See Note NPN: type M9642 NPN: type LM9014D
R301 R302 R303 R304 R305	0660075C97 0660075C73 0660075C89 0660075C77 1805157J01	<b>RESISTOR, Fixed:</b> $\pm$ 5%; $\frac{1}{8}$ W unless stated 100 k 10 k 47 k 15 k Pot., 50 k - 10%
U301 U302 U303 U304 U305	5105337F05 5105337F06 NLN5762A 5105337F17 5105337F10	<b>HYBRID MODULE:</b> See Note Decode Filter Data Clock Code Plug (not part of DPL kit) Digital Processor Encode Filter
VR301	4805189E03	<b>DIODE:</b> See Note Zener, 5.6 V
Y301	4882656M01	<b>CRYSTAL:</b> 50 kHz
<b>NONREFERENCE ITEMS</b>		
	0300139444	SCREW, Phillips; 2-56 x $\frac{1}{2}$ in.
	0705699J01	BRACKET
	0905287C05	SOCKET, Printed Circuit
	4205175E02	RETAINER, Spacer
	7505506D10	PAD, Module (for U301)
	7505506D13	PAD, Module (for U304)
	7505506D14	PAD, Module (for U302)
	8405700J01	CIRCUIT BOARD

NOTE: For optimum performance, order replacement diodes, transistors, and hybrid modules by Motorola part number only.

VIEWED FROM SOLDER SIDE



SS-AEPF-10740-0  
DS-AEPF-10741-0  
OL-AEPF-10742-A

## PL SQUELCH SENSITIVITY CHECK

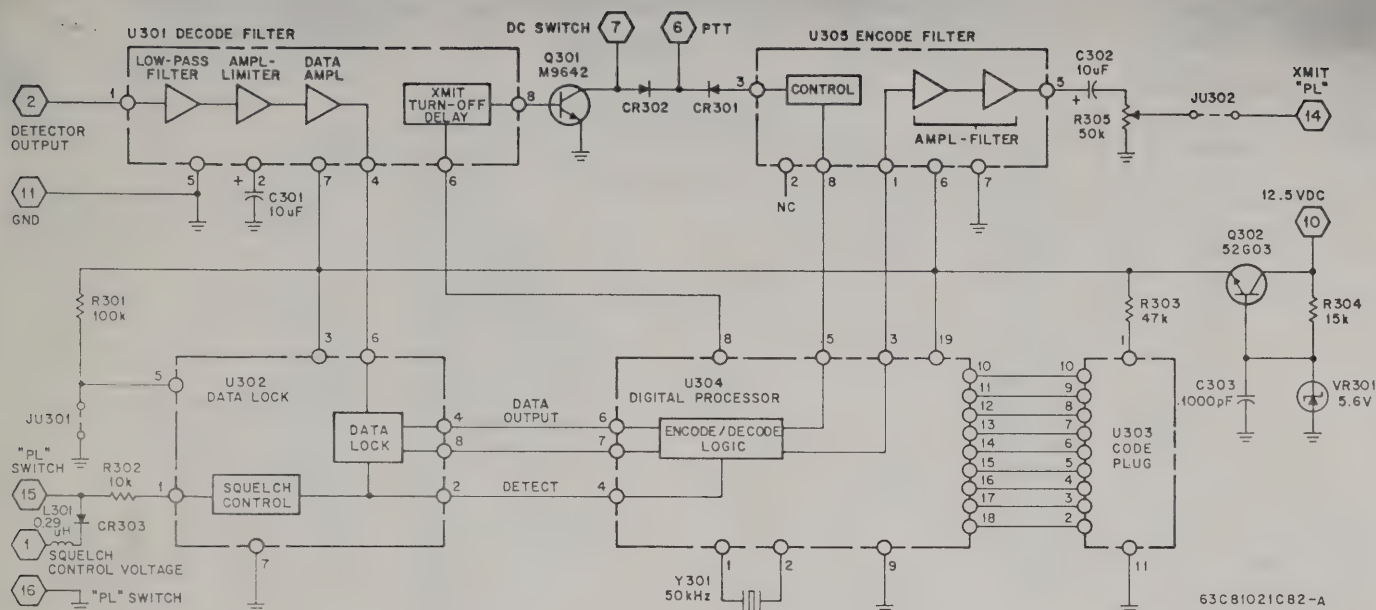
1. SET THE PL/SQUELCH CONTROL SWITCH (S203/R201) FULLY COUNTERCLOCKWISE PAST DETENT TO THE PL ON POSITION.
2. APPLY AN ON-FREQUENCY CARRIER SIGNAL FROM THE SIGNAL GENERATOR. MODULATE THE SIGNAL GENERATOR WITH THE PROPER PL TONE, AT  $\pm$  0.5 kHz DEVIATION.
3. THE SQUELCH CIRCUIT SHOULD OPEN WHEN THE SIGNAL GENERATOR OUTPUT IS INCREASED ABOVE 0.10  $\mu$ V AT 0.25  $\mu$ V (1)

EPF-10794-0





# SCHEMATIC DIAGRAM



## DPL TEST MEASUREMENTS CHART

PIN NO.	ENCODE		DECODE		PIN NO.	ENCODE		DECODE	
	VOLTAGE	WAVEFORM	VOLTAGE	WAVEFORM		VOLTAGE	WAVEFORM	VOLTAGE	WAVEFORM
DECODE FILTER U301					DIGITAL PROCESSOR U304				
1	0 Vdc	---	2.3 Vdc	---	1	2.75 Vdc	---	2.75 Vdc	---
2	0.14 Vdc	---	2.3 Vdc	---	2	---	0.5 V p-p at 50 kHz	---	0.5 V p-p
4	5.0 Vdc	---	---	5.0 V p-p (1)	3	2.4 Vdc	5.0 V p-p (3)	2.0 Vdc	---
6	5.0 Vdc	---	0 Vdc	---	4	0 Vdc	---	0 Vdc	---
7	5.0 Vdc	---	5.0 Vdc	---	5	5.0 Vdc	---	0 Vdc	---
8	0.79 Vdc	---	0 Vdc	---	6	1.0 Vdc	5.0 V p-p at 100 Hz	---	5.0 V p-p (1)
DATA LOCK U302					7	---	5.0 V p-p, 537 Hz Pulse Train	---	5.0 V p-p, 537 Hz Pulse Train
1	5.0 Vdc	---	5.0 Vdc	---	8	5.0 Vdc	---	0 Vdc	---
2	0 Vdc	---	0 Vdc	---	10 thru 18	0 Vdc (2)	---	0 Vdc (2)	---
3	5.0 Vdc	---	5.0 Vdc	---	19	5.0 Vdc	---	5.0 Vdc	---
4	1.0 Vdc	5.0 V p-p at 100 Hz	---	5.0 V p-p (1)	ENCODE FILTER U305				
5	0 Vdc (4)	---	0 Vdc (4)	---	1	2.4 Vdc	5.0 V p-p (3)	2.0 Vdc	---
6	5.0 Vdc	---	---	5.0 V p-p (1)	2	2.0 Vdc	---	2.0 Vdc	---
8	---	5.0 V p-p, 537 Hz Pulse Train	---	5.0 V p-p, 537 Hz Pulse Train	3	0.88 Vdc	---	5.0 Vdc	---
CODE PLUG U303					5	2.0 Vdc	1.2 V p-p (3)	2.0 Vdc	---
1	5.0 Vdc	---	5.0 Vdc	---	6	5.0 Vdc	---	5.0 Vdc	---
2 thru 10	0 Vdc (2)	---	0 Vdc (2)	---	8	5.0 Vdc	---	0 Vdc	---

TEST MEASUREMENTS ARE NOMINAL, PL SWITCH ON OR OFF AND NO CARRIER INPUT. NUMBERS IN ( ) REFER TO THE FOLLOWING NOTES:

- (1) DIGITAL WAVEFORM.
- (2) CODE PLUG REMOVED.
- (3) RANDOM DIGITAL DPL WAVEFORM; CHANGES TO 135 Hz WAVEFORM ON DEKEY OF PTT SWITCH.
- (4) JU301 SHORTED (5.0 VDC IF JU301 IS OPEN).

EPF-10739-A





## Exploded View Parts List

PLF-1891-A

ITEM NO.	MOTOROLA PART NO.	DESCRIPTION
1	0105950G05 or 0105950G06	ASSEMBLY, Front Cover; includes item 2: Standard Silverized
2	4205187J01	RETAINER, Gasket; not field repairable. order item 1
3	3205082E10	GASKET, Seal
4	3305153J01	LABEL, Nameplate
5	1105932J01	ADHESIVE, Felt
6	3505152J01	FELT, Speaker
7	See Note	SPEAKER (LS401)
8	7505182J01	PAD, Microphone Boot
9	See Note	MICROPHONE (MK401)
10	0705155J01	BRACKET, Microphone
11	7505200J01	BOOT, Microphone
12	0300138651	SCREW, Phillips; 2-56 x 1/4"
13	4205670D01	CLAMP, Speaker
14	See Note	CONNECTOR (P401)
15	3205332K01	SEAL
16	4182093A07	SPRING, Actuator; coiled
17	4505177J01	ACTUATOR, Push-to-Talk
18	0705175J01	BRACKET, Actuator
19	4105176J01	SPRING, Actuator
20	2205179J01	PIN, Retainer
21	3205082E13	GASKET, O-Ring
22	0305466C02	SCREW, Special; 4-40 x 0.140"
23	4605170J01	STUD, Latch
24	3205082E14	GASKET, O-Ring
25	4105172J01	SPRING, Latch
26	5505173J01	LATCH, Pawl
27	0405171J01	WASHER, Teflon
28		Not Used
29		ASSEMBLY, Housing; includes items 36, 37, 38, and 39: Standard Silverized
30	0105954G94 or 0105954G95	SCREW, Phillips; 4-40 x 1/2"
31	0484345A06	WASHER, Seal
32	-----	LABEL, FCC Identification; not field replaceable
33	-----	LABEL, Frequency; not field replaceable
34	4210219A25	RETAINER, E-Clip
35	See Note	FUSE (F501)
36	*	CONTACT, Strap
37	*	CONTACT, Positive
38	*	CONTACT, Negative
39	*	BUSHING, Strap
		* Items 36, 37, 38, and 39 are not field repair- able; order applicable Housing Assembly (item 29).
40	3205082E13	GASKET, O-Ring
41		Not Used
42	0305887J01	SCREW, Slotted; 4-40 x 3/16"
43	8405156J01 or 8405158J01 or 8405159J01	CIRCUIT BOARD, VHF CIRCUIT BOARD, UHF (1-Watt) CIRCUIT BOARD, UHF (4-Watt)
44	See Note	PTT SWITCH (S202)
45	0705162J01	BRACKET, PTT Switch
46	0305887J01	SCREW, Slotted; 4-40 x 3/16"
47	4305936J01	BUSHING, Shoulder
48	3905174J01	CONTACT
49	0400008406	LOCKWASHER
50	0300138651	SCREW, Phillips; 2-56 x 1/8"
51	4305209J01	SLEEVE
52	-----	TYPICAL BATTERY PACK
53		Not Used
54A	See Note	SWITCH, Frequency; Toggle (S201)
55	-----	LOCKWASHER
56	2905658K01	LUG
56A	-----	LOCKWASHER, Internal Tooth (p o item 78)
57	See Note	SWITCH, Volume ON-OFF (R202 S204)
58	3905195J02	CONTACT

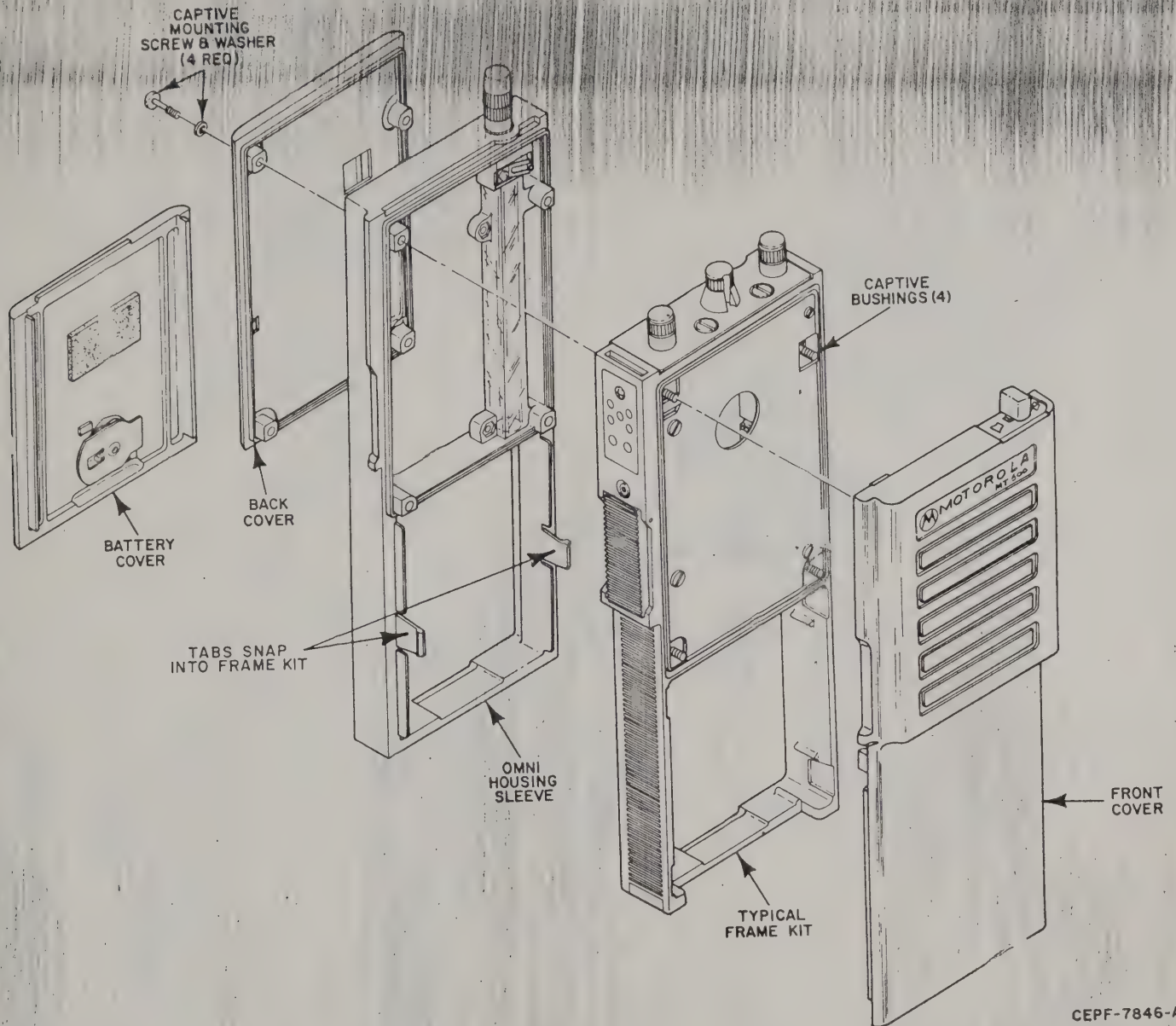
59	**	PLATE, Retainer
60	**	BUSHING
61	**	PANEL, Control
		** Items 59, 60, and 61 are not field repairable; order Assembly: 0105950G14
62	See Note	SWITCH, PL Squelch Control (S201/R201)
63	See Note	JACK, Speaker (J202)
64	0405662K01	WASHER, Insulating
65	3205082E15	SEAL, O-Ring
66	0205164J01	NUT, Spanner
67	0400002642	LOCKWASHER, Internal Tooth
68	3205082E09	SEAL, O-Ring
69	0282653D03	NUT, Spanner
70	3205933J01	SEAL, Switch
71	3205082E11	SEAL, O-Ring
72	3805216J02	PLUG, Seal
73	3205082E12	SEAL, O-Ring
74	4305206J01	SLEEVE
75	6405208J01	PLATE, Pressure
76		ESCUICHEON, Graphic; for: 1305181J01 Basic, Carrier Squelch Models or 1305181J02 Universal, Carrier Squelch Models or 1305181J09 Basic, PL Squelch Models or 1305181J10 Universal, PL Squelch Models
77	-----	SEAL, O-Ring (p o item 78)
78	See Note	CONNECTOR, Antenna (J203); includes item 77
79	See Note	CONNECTOR, Universal (J201)
79A	3805216J01	PLUG, Seal (Basic Models)
80	0205050E01	NUT, Spanner
81	0305662D17	SCREW, Captive
82	0300129A24	SCREW, Slotted; Nylon
83		Not Used
84		Not Used
85	3205217J01	SEAL, Cap
86	0383174C05	SCREW, Set
87	3605207J01	KNOB, Volume and Squelch
88		Not Used
89	0405171J02	WASHER, Nylon
90	0282653D07	NUT, Spanner
91	0400009777	LOCKWASHER, No. 4
92	1405637K01	INSULATOR
93	3205643K01	GASKET

NOTE: Refer to electrical parts list for part number and description.





# DISASSEMBLY PROCEDURE



CEPF-7846-A

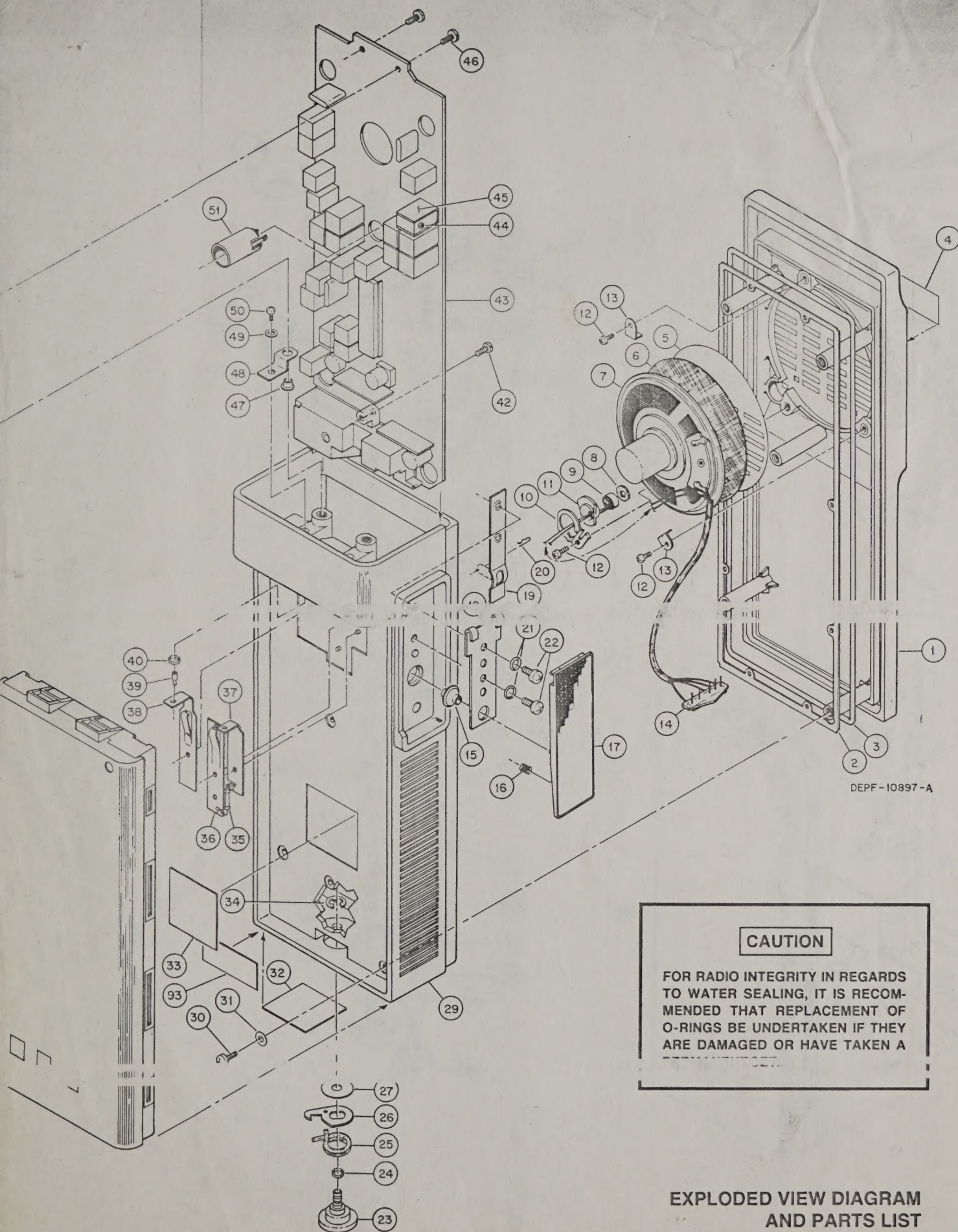
## PROCEDURE

1. TURN THE SLOTTED SCREW HEAD ON THE BATTERY COVER ONE-QUARTER TURN COUNTERCLOCKWISE AND REMOVE THE BATTERY COVER.
2. REMOVE THE BATTERY.
3. LOOSEN THE FOUR CAPTIVE SCREWS HOLDING THE BACK COVER AND REMOVE THE BACK COVER.
4. REMOVE SNAP-ON SLEEVE (OMNI-HOUSING ONLY).
5. LOOSEN THE FOUR CAPTIVE BUSHINGS HOLDING THE CHASSIS FRAME TO THE FRONT COVER.
6. SEPARATE THE FRONT COVER FROM THE FRAME.
7. UNPLUG THE WIRES CONNECTING THE FRONT COVER TO THE CHASSIS FRAME.

EPF-7847-Q







EXPLODED VIEW DIAGRAM  
AND PARTS LIST







